Universidad de Valparaíso CHILE

Instituto de Física y Astronomía
Facultad de Ciencias, U. de Valparaíso

INSTITUTO FISICA Y Astronomía

COLOQUIOS UV ASTRONOMIA
Lista de Coloquios UV en astronomía
Sala Juan Mouat, Facultad de ciencias, Universidad de Valparaíso

Año 2017

Jueves 16 de Marzo del 2017
María José Maureira, Yale University.
"Probing the earliest phases of low mass star formation using observations of First Core Candidates"

Nearly all stages of the star formation process have been observed in large samples and compared to theoretical predictions. However, one stage remains unobserved: the first hydrostatic core (FHSC or first core). The first core is a short-lived object in quasi-hydrostatic equilibrium that forms at the center of a collapsing core before the formation of a protostar. Observational evidence of the FHSC is of prime importance in our understanding of the early evolution of dense cores, protostars and circumstellar disks. I will present molecular line observations of first cores candidates that reveal the kinematics of the surrounding gas at 1000 AU scales. Our analysis provide strong evidence that one of the sources (L1451-mm) is indeed at a very early stage of evolution, making the best candidate for being a bonafide first core. In addition, we find that the structure and velocity field of the infalling gas of another candidate is consistent with turbulent core collapse, further showing that first core candidates are an ideal astrophysical laboratory for probing the initial conditions of low-mass star formation. I will highlight how future observations could help us to further reveal the evolutionary state of these sources as well as provide evidence that can test the predictions of (and set strong constraints on) numerical simulations of core collapse and protostar formation.

Jueves 23 de marzo del 2017
J. Christopher Howk, University of Notre Dame
"A New Approach to the Cosmic Lithium Problem"

The predictions of light element abundances in standard Big Bang Nucleosynthesis agree very well with astrophysical probes of primordial material, with the exception of lithium. Most of the observational constraints we have on the primordial abundance and cosmic evolution of Li comes by way of the Li abundance in stellar atmospheres, which are four times lower than BBN predictions in the WMAP-era. A broad range of potential solutions to this "lithium problem" have been suggested, from stellar astrophysics solutions (depletion of the surface Li abundances in stars) to physics beyond the Standard Model (annihilating or decaying dark matter in the epoch of BBN). We have adopted a new approach to this problem, using observations of Li in interstellar gas of low-metallicity galaxies to probe the cosmic evolution of Li. I will summarize our recent results using this approach, which leave the door open for new physics in the early Universe.

Jueves 13 de Abril del 2017
Dr. Diego Saez, Instituto de Ciencias del Espacio de Barcelona
"Is the universe heading towards a violent end?"

How the accelerating expansion of the universe works is one of the most important challenges in physics nowadays. On the other hand, General Relativity (and other metric theories) contains inherently singularities, which refer to singular points of the spacetime, i.e. geodesically incomplete spacetimes according to the usual definitions by Hawking and Ellis. Over the last years, some proposed dark energy models drive the universe towards one of these future "singularities", near which the laws of physics break down. In this talk, I will review and show the physical features of these singularities and present a new one that encompasses all the future singularities in cosmology. Then, I will present several phenomenological parameterizations of the Hubble expansion rate to model different types of singularities and use SN Ia, BAO and H(z) data to constrain how far in the future the singularity may be, and how good the models are in comparison with the concordance model in cosmology.

Jueves 20 de Abril del 2017
Aleksandra Solarz, National Centre for Nuclear Research, Warsaw, Poland
"From space to cyberspace: automatic anomaly detection in AllWISE Sky Survey"

Wide-angle photometric surveys of previously uncharted sky areas or wavelength regimes will always bring in unexpected sources whose existence and properties cannot be easily predicted from earlier observations. Such objects can be efficiently sought for with novelty detection algorithms.
I will present an application of such a method, called one-class support vector machines (OCSVM), to search for anomalous patterns among sources preselected from the mid-infrared AllWISE catalogue covering the whole sky.
OCSVM successfully finds artefacts, such as objects with spurious photometry due to blending, but most importantly also real sources of genuine astrophysical interest.
Among the latter, OCSVM has identified a sample of heavily reddened AGN/quasar candidates distributed uniformly over the sky and in a large part absent from other WISE-based AGN catalogues. It also allowes to find a specific group of sources of mixed types, mostly stars and compact galaxies. By combining the semi-supervised OCSVM algorithm with standard classification methods it will be possible to improve the latter by accounting for sources which are not present in the training sample but are otherwise well-represented in the target set.

Jueves 27 de Abril del 2017
Dr. Leonardo Vanzi. Pontifica Universidad Católica de Chile.
"Zen and the Art of building Astronomical Instruments"

In this seminar I will report about the activity of astronomical instrumentation developed at the Center of Astro Engineering UC. In particular I will present the work done by our team in the area of spectroscopy from the early steps to the recent installation of FIDEOS at the ESO 1m telescope of La Silla. Building an astronomical instrument is an adventure of many challenges, where science and technology are not necessarily the most relevant parameters. By telling the story of FIDEOS I will try to share the process and the feelings we went through as a team. The result of this effort is to have today a Chilean instrument installed at an international observatory, a situation which is somehow new and therefore worth some meditation.

Jueves 11 de Mayo del 2017
Dr. Jorge Noreña. Pontificia Universidad Católica de Valparaíso.
"Looking for the symmetry of the universe in correlation functions"

Primordial correlation functions beyond the two-point function give us a direct probe to the non-linear physics and interactions during inflation. In this sense they are the analogue of scatterings in particle physics. Of particular interest is the so-called squeezed or soft limit in which one of the momenta is much smaller than the other two. If the evolution of the universe is adiabatic (in a sense which we will discuss) the shape of correlation functions in this limit is fixed. This means that a deviation from adiabaticity, such as that due to the presence of additional fields or non-trivial symmetry breaking patterns, would leave a characteristic signal. Furthermore, this is also true in the late universe even at very non-linear scales. Therefore, if present in observations, this characteristic behavior would signal the presence of additional fields during inflation or more non-trivial physics; and no local non-linear astrophysical process can contaminate signal.

Jueves 18 de Mayo del 2017
Mauricio Echiburú, Universidad de Viña del Mar.
"Medición del pensamiento científico e influencia de las metodologías activas en el aprendizaje"

La presente charla tratará sobre los diferentes niveles cognitivos de los estudiantes y cómo a través del test de Lawson se pueden determinar los niveles de razonamiento científico de un grupo de estudiantes. Esta cualidad es primordial para todo estudiante Universitario, sea del área de Ciencias o no. Los cambios de un nivel de pensamiento a otro se producen por madurez y en tiempos que van desde un semestre hasta los años, pero que si no se incentivan no habrá evolución. Frente a esto, se ha demostrado que las metodologías activas de enseñanza ayudan de mejor manera a generar estos cambios frente a las metodologías tradicionales de enseñanza, los resultados obtenidos bajo esta metodología en la Universidad Viña del Mar muestran que es posible desarrollar estas estrategias en aula con buenos resultados.

Jueves 25 de Mayo del 2017,
Dr. Gustavo Orellana, Universidad de Concepción.
"Efficient and Accurate Tools to Trace the Evolution of Galaxies"

Galaxy formation and evolution is one of the most relevant topics in modern astronomy. However, we still have many questions to solve.

In order to solve these questions, astronomers use measurements of fundamental parameters of the galaxies, such as star formation rate (SFR), stellar mass, and characteristics of the interstellar medium (ISM).

Since the star formation occurs within the ISM, it is necessary to understand its physical conditions and its involved mechanisms. The ISM is mainly composed by gas (atomic and molecular) and dust.

There have been only small (100) samples studying the dst in galaxies. However, this has changed thanks to space telescopes like Herschel and Planck.

The main goal of this thesis is to build scale relations that facilitate the estimation of multiple parameters. For this reason, we compiled the largest (~1.600) catalog of nearby galaxies (z 0.1) with infrared (R) and sub-millimeter (sub-mm) data.

Using dust emission models, we find that the total gas mass and the dust mass are tightly correlated. But the factor used to convert from sub-mm luminosity to gas mass is not constant, suggesting the need of more information. In this work, we find that the dust mass, the IR luminosity and the dust temperature form a plane, 'the dust plane'. This plane allows us to build several scale relations in order to calculate the dust mass and the IR luminosity, from sub-mm and dust temperature measurements. Additionally, we construct a variety of IR and sub-mm colors to estimate dust temperatures. We have also obtained a calibration between measurements from Planck~ and SCUBA.

Finally, we explore the plane formed by the molecular gas mass traced by the CO line, the IR luminosity (SFR tracer), and the sub-mm luminosity (related to dust mass) for samples at low- and high-redshift galaxies. Using this plane, we can obtain gas masses from simple IR and sub-mm observations. This work is highly recommended for future research on galaxy formation and evolution. The presented results will be remarkably useful to estimate fundamental parameters of galaxies, using fewer observations compared to previous studies. Taking advantage of the vast amount of available information from the last large surveys, our results will show a considerable difference on the invested time and the accuracy of the results obtained by future investigations.

Viernes 26 de Mayo del 2017
Dr. Philip Lucas, University of Hertfordshire.
“VVV and UKIDSS observations of extreme variabilty in Young Stellar Objects”

Young Stellar Objects (YSOs) are occasionally seen to undergo eruptions of up to 5 mag in the infrared, on timescale ranging from weeks to a century. This is thought to be due to variable accretion in the circumstellar disc but the nature of the instability is unknown. The VVV and UKIDSS surveys have allowed us to detect large numbers of highly variable YSOs for the first time, revealing that episodic accretion is quite common in class I and flat spectrum YSOs. I will summarise what we have learned from these samples so far and discuss strategies for future work, including further searches of the VV/VVVX database, spectroscopic follow up and synergies between VVV and LSST.

Jueves 1 de Junio del 2017
Dra. Gesa H.-M. Bertrang, Universidad de Chile.
"On magnetic fields and what we can learn from polarimetry in protoplanetary disks"

Magnetic fields are predicted to be an important factor for a wide range of physical processes in protoplanetary disks. In the classical picture, (sub-)mm continuum polarisation is the tracer for magnetic fields in disks. Aspherical dust grains, whose thermal emission is intrinsically polarized, get aligned by the magnetic field due to radiative torques. In recent years, however, this picture has been challenged. New theoretical studies show that (sub-)mm continuum polarisation can also be created by scattering of the thermal dust emission or arise from aspherical grains which are aligned by the radiation field rather than the magnetic field. These three mechanisms trace fundamentally different physics in protoplanetary disks, yet, their polarisation predictions are not clearly distinguishable. In this talk, I will highlight the role of magnetic fields in protoplanetary disks, present already achieved (indirect) observational constraints, and give an outlook on how to disentangle the sources of continuum polarimetry with ALMA.

Jueves 8 de Junio del 2017
Dra. Chiara Mazzucchelli, MPIA de Heidelberg, Alemania
"Quasars in the Epoch of Reionization"

Quasars are among the most luminous, non-transient extragalactic sources in the sky, and hence they can be observed at extremely large cosmological distances, e.g. at redshift z>6.

These sources, hosting supermassive black holes (SMBHs; M>10^8 Msun), at only ~1 Gyr after the Big Bang, represent a crucial challenge to modern theories of SMBHs formation, and are expected to be found in regions of high density peaks of the dark matter distribution. Additionally, they can be used as key probes of the state of the intergalactic medium (IGM) well into the epoch of reionization.

In this talk, I will present our search for high redshift quasars in the Pan-STARRS1 Survey, which more than double the number of known sources at z~6.

In particular, I will focus on a comprehensive analysis of the highest redshift quasar sample (z>6.5), supported by new NIR/optical spectroscopic observations, as well as new mm data collected with NOEMA. I will present several quasar properties, e.g. virial black hole masses, magnesium-to-iron line flux ratios, near zones sizes, and I will place them in the context of lower redhift measurements, and of current thereotical models.

Moreover, I will explore the galactic environments of a quasar at z~6, in order to probe the presence of the expected galaxy overdensity.

Jueves 15 de Junio del 2017
Dr. Radouane Gannouji, Pontificia Universidad Católica de Valparaíso
"Modified Gravity"

I will introduce the current problems in cosmology and a possible road of investigation, modified gravity. If a modification of gravity can be considered as welcomed at large scales, to explain the recent acceleration of the universe, we need to hide the additional field locally. I will discuss various mechanisms to hide the modification of gravity in local experiments.

Jueves 6 de Julio del 2017
Dr. Andronikos Paliathanasis, Universidad Austral de Chile
"Algebraic Solutions in Scalar Field Cosmology: Reconstruction of the dark energy equation of state and the inflationary potential."

An algebraic solution for arbitrary potential is presented in the context of scalar field cosmological models. That result is used to generate new solutions of the scalar field equations in homogeneous and isotropic universes. A series of generalizations of the Chaplygin gas and bulk viscous cosmological solutions for inflationary universes are found. Finally, we show how the Hubble slow-roll parameters can be calculated using the solution algorithm and we compare these inflationary solutions with the observational data provided by the Planck 2015 collaboration to constraint and rule out some of these models.

Martes 22 de Agosto del 2017
Dra. Anita Zanella, Universidad de Padova.
"The [CII] emission line as a molecular gas tracer in high-redshift galaxies"

So far the gas conditions in main-sequence galaxies at the peak of the cosmic star formation history have been mainly investigated through the CO emission lines. However, observing the CO transitions at higher redshift becomes challenging, since the lines luminosity weaken as metallicity decreases. A powerful alternative could be the [CII] emission at 158um instead: it is the brightest line in the radio and far IR regime observed in star-forming galaxies, it is the main coolant of the interstellar medium (ISM), and it does not seem to fade at low metallicity. Local studies show that the [CII] luminosity correlates with the galaxy star formation rate (SFR), although main-sequence sources and starbursts seem to have different behaviours.

At higher redshift the picture is even less clear and only samples of starbursts have been analyzed so far. To remedy this situation we have observed with ALMA a sample of ~ 10 main-sequence sources at z ~ 2 with the aim of tackling the following questions: is [CII] a good tracer of the molecular gas? How does it depend on the galaxy physical properties (e.g. SFR, hardness of radiation field, dust temperature and mass, specific SFR)? Answering these questions for z ~ 2 galaxies whose physical conditions are nowadays reasonably well understood will lay the ground for future explorations of the ISM at much higher redshift.

Jueves 28 de Septiembre del 2017
Gael Chauvin, PAG-Grenoble, UMI Francia-Chile, Universidad de Chile
"Imaging other worlds"

With the development of direct imaging techniques and instruments, vast efforts have been devoted during the past decades to image lighter, cooler and closer companions to nearby stars, and ultimately exoplanetary systems. Complementary to other planet-hunting techniques, direct imaging has opened a new astrophysical window to explore the physical properties and the formation mechanisms of giant planets. In this seminar, I will briefly review the impressive evolution of the instrumentation, techniques and observing strategies in direct imaging over the years. I will present key results on the diversity of young planetary architecture, on the formation and evolution mechanisms of giant planets and on the physical processes at play in young planetary atmospheres. I will finally conclude on the rich perspectives offered by the upcoming extremely large telescopes to image and characterize super-Earths and to ultimately discover the first traces or reliable clues of bio-signatures in their atmospheres**.**

Jueves 5 de Octubre del 2017
Nelson Padilla, Pontificia Universidad Católica
"Testing gravity with cosmic voids"

Cosmic voids are underdense regions that usually span large volumes of equivalent radius of tens of Mpc. Their low densities make them ideal probes for proposed modifications to gravity that are characterised by a fifth force that is expected to act in sparse environments. This is the case of f(R) models. In this talk I will summarize recent results on statistics of cosmic voids measured in General Relativity (GR) and f(R) simulations with equal initial conditions and z=0.5 clustering, and will show how one can tell apart these models using weak lensing and a competitive way to measure the rate of growth of structures from redshift space distortions.

Jueves 12 de Octubre del 2017
Sebastian Lopez, Universidad de Chile
"MUSE gravitational-arc tomography of the z=1 circum-galactic medium"

I will report on our recent MUSE observations of bright gravitational arcs to map the spatial distribution of the z=1 CGM. I will discuss our results and argue that this technique opens a new window in absorption-line studies of the high-redshift universe.

Jueves 19 de Octubre del 2017
Jessica Werk, University of Washington
"Circumgalactic Matter Matters"

The circumgalactic medium (CGM; non-ISM gas within a galaxy virial radius) regulates the gas flows that shape the assembly and evolution of galaxies. Owing to vastly improved capabilities in space-based UV spectroscopy with the installation of HST/COS, observations and simulations of the CGM have merged as the new frontier of galaxy evolution studies. In the last decade, we have learned that the CGM of Milky Way mass galaxies likely contains enough material to harbor most of the metals lost in galaxy winds and to sustain star-formation for billions of years. Remarkably, this implies that most of the heavy lements on earth cycled back and forth multiple times through the Milky Way's own CGM before the formation of the solar system. In this talk, I will discuss new constraints we have placed on the origin and fate of this material by studying the gas kinematics, metallicity and ionization state. I will conclude by posing several unanswered questions about the CGM that will be addressed with future survey data and hydrodynamic simulations in a cosmological context.

Jueves 26 de Octubre del 2017
Guillermo Blanc, Carnegie - Universidad de Chile
After SDSS-IV (AS4) Project: Pioneering Panoptic Spectroscopy

AS4 will perform the first-ever all-sky, multi-epoch survey involving both near-infrared and optical spectroscopy, building-on the existing APOGEE (near-infrared) and BOSS (optical) spectrographs from Apache Point Observatory (APO) in New Mexico and Las Campanas Observatory (LCO) in Chile, with rapid target allocation enabled by new fiber-positioning robots, and adding a suite of new wide-field optical integral-field spectrographs on both sites. AS4 will have three survey components. The Milky Way Mapper will conduct infrared spectroscopy of over 6 million stars, to chart and interpret our Galaxy's history, and to understand the astrophysics of stars and their relation to planets. The Black Hole Mapper will monitor quasars and X-ray sources from next-generation X-ray satellites to teach us about the physics and evolution of supermassive black holes. The Local Volume Mapper will conduct an optical Integral Field Spectroscopy (IFS) survey of our Galaxy and its neighbors, placing the Milky Way in context and testing modern theories of star and galaxy formation. AS4 is expected to operate at both APO and LCO in the 2020-2025 timescale, and we are seeking to involve the whole Chilean astronomical community in this ambitious project.

Jueves 2 de Noviembre del 2017
Ali Ovgun, Pontificia Universidad Católica de Valparaíso
"Thin-shell Wormholes and Gravastars"

The study of traversable wormholes is very hot topic for the past 30 years. One of the best possible way to make traversable wormhole is using the thin-shells to cut and paste two spacetime which has tunnel from one region of space-time to another, through which a traveler might freely pass in wormhole throat. hese geometries need an exotic matter which involves a stress-energy tensor that violates the null energy condition. However, this method can be used to minimize the amount of the exotic matter. In this talk, I will show my studies on the thin-shell wormholes in general relativity in 2+1 and 3+1 dimensions and heir stabilities. Moreover, I will mention about the thin-shell gravastars as an alternative model for black holes.

Miercoles 8 de Noviembre del 2017
Dr. Devika Kamath, Macquarie University, Australia
"Using stellar fossils to probe the origin of elements in Universe"

Abstract: It is established that low- and intermediate-mass (less than ~10 solar masses) evolved stars are key contributors to the chemical evolution of their host galaxy. However, the physics that governs the evolution and nucleosynthesis of these cosmic chemical factories is still uncertain. By observing stellar fossils: low- and intermediate-mass post-Asymptotic Giant Branch (post-AGB) stars, we can rebuild the history of the element production that occurred during their lives. Our detailed LTE and NLTE chemical abundance studies of post-AGB stars have revealed that their exists a large and interesting chemical diversity: e.g., stars that are enhanced in carbon and enriched in s-process elements to stars that do not show any traces of carbon to stars that display a 'depleted' photospheric chemistry that is devoid of refractory elements. This chemical diversity reflects on the initial mass and metallicity of the star, its evolutionary channel, and on processes such as mass-loss, dredge-up, extra mixing, and the notorious hot bottom burning, that govern stellar evolution and nucleosynthesis. In my talk I will present the chemical diversity observed in evolved stars while explaining how we use this to understand various stellar evolutionary channels and the synthesis of chemical elements by evolved stars.

Jueves 9 de Noviembre del 2017
Dr. Gesa H.-M. Bertrang, visiting from the Universidad de Chile
On magnetic fields and what we can learn from polarimetry in protoplanetary disks

Young stars are surrounded by disks of dust and gas. These circumstellar disks are the birthplaces of planets. Understanding the physical processes in these disks is vital for the understanding of planet formation. It has been predicted that magnetic fields are an important factor on a wide range of physical processes in protoplanetary disks, such as the migration of planet (esimals) and the mere evolution of disks. Yet, observational constraints are still pending. In the classical picture, (sub-) mm continuum polarization is the tracer for magnetic fields in disks. Aspherical dust grains, whose thermal emission is intrinsically polarized, get aligned by the magnetic field due to radiative torques. In recent years, however, this picture has been challenged. New theoretical studies show that (sub-)mm continuum polarization can also be created by scattering of the thermal dust emission or arise from aspherical grains which are aligned by the radiation field rather than the magnetic field. These three mechanisms trace fundamentally different physics in protoplanetary disks; yet, their polarisation predictions are not clearly distinguishable. In this talk, I will highlight the role of magnetic fields in protoplanetary disks, present first achievements on (indirect) observational constraints, and give an outlook on how to disentangle the sources of continuum polarimetry with ALMA.

Jueves 16 de Noviembre del 2017
Dr. Andrés Anabalón, Universidad Adolfo Ibáñez
Universal Formula for the holographic speed of sound.

"We consider planar hairy black holes in five dimensions with a real scalar field in the Breitenlohner-Freedman window and show that is possible to derive a universal formula for the holographic speed of sound for any mixed boundary conditions of the scalar field. As an example, we locally construct the most general class of planar black holes coupled to a single scalar field in the consistent truncation of type IIB supergravity that preserves the SO(3)xSO(3) R-symmetry group of the gauge theory. We obtain the speed of sound for different values of the vacuum expectation value of a single trace operator when a double trace deformation is induced in the dual gauge theory. In this particular family of solutions, we find that the speed of sound exceeds the conformal value. Finally, we generalize the formula of the speed of sound to arbitrary dimensional scalar-metric theories whose parameters lie within the Breitenlohner-Freedman window."

Jueves 23 de Noviembre del 2017
Matías Montesinos, Instituto de Astrofísica, Pontificia Universidad Católica de Chile
Spirals and shadows in protoplanetary disks

Despite the recent discovery of spiral-shaped features inprotoplanetary discs in the near-infrared and millimetric wavelengths, there is still an active discussion to understand how they formed.
Several physical mechanisms have been proposed to explain such observations: planet/companion torques, gravitational perturbations, and recently illumination effects. In this talk, I will discuss the spirals formed in the gaseous phase due to two diametrically opposed shadows cast either at fixed disc locations or in a rotational motion. The shadows are created by an inclined precessing disc inside the cavity, which is assumed to be optically thick. In particular, we analyze the effect of these spirals on the dynamics of the gas/dust particles and discuss their detectability in transition discs emulating ALMA millimetric-wavelength observations.

Jueves 30 de Noviembre del 2017
Jerome Bouvier, - Institut de Planetologie et astrophysique de Grenoble
Rotational properties and spin evolution of solar-type stars: observation and modeling

Angular momentum is, together with mass and chemical composition, one of the fundamental properties of stars that will ultimately determine their fate. In this mini-course, I will first briefly review the various techniques used to measure stellar rotation rates. Then, i will describe the status of our current knowledge of stellar rotation, focusing on solar-type and lower mass stars, from their birth to the end of the main sequence. In a third part, i will describe a class of angular momentum evolution models that attempt to reproduce the observed evolution of the spin rate of low mass stars as they age. These models rely on various physical processes, including star-disk interaction during pre-main sequence evolution, rotational braking by magnetized winds, and angular momentum transport within the stellar interior between the inner radiative core and the outer convective envelope. I will conclude by highlighting a few currently unsolved issues related to stellar rotation.

Jueves 14 de Diciembre del 2017
Estelle Moraux
"Observational constraints on the formation and evolution of young stellar clusters in the Gaia era"

It is now well established that most stars form in groups or clusters with N=10-10^5, but that about 90% of them are going to dissolve within a few Myrs after gas removal. To understand the general rules that govern how the majority of stars form, as well as the properties of stars that populate the galactic field, it is therefore crucial to study the formation and early evolution of stellar clusters. For this purpose, statistical properties of young stars need to be investigated and characterized. These include the initial mass function (IMF), the multiplicity, and the spatial and kinematic distributions.

In this presentation, I will briefly review these stellar properties in young nearby clusters with a particular focus on the low mass IMF, and I will explain the effect of the cluster dynamical evolution on these quantities. I will then discuss how the Gaia data will help us to considerably improve our knowledge on stellar clusters.