International Astronomical Union
Union Astronomique Internationale

POST MEETING REPORT FORM

Attached documents

(i) Final scientific programme:

IAUS379: Dynamical Masses of Local Group Galaxies

de **lundi 20 mars 2023 (09:00)** à **vendredi 24 mars 2023 (18:40)**
Haus H, Telegrafenberg

: Sessions / : Talks : Breaks

20 mars 2023

AM
09:00 Welcome Remarks - Francois Hammer Marcel Pawlowski (AIP) ()
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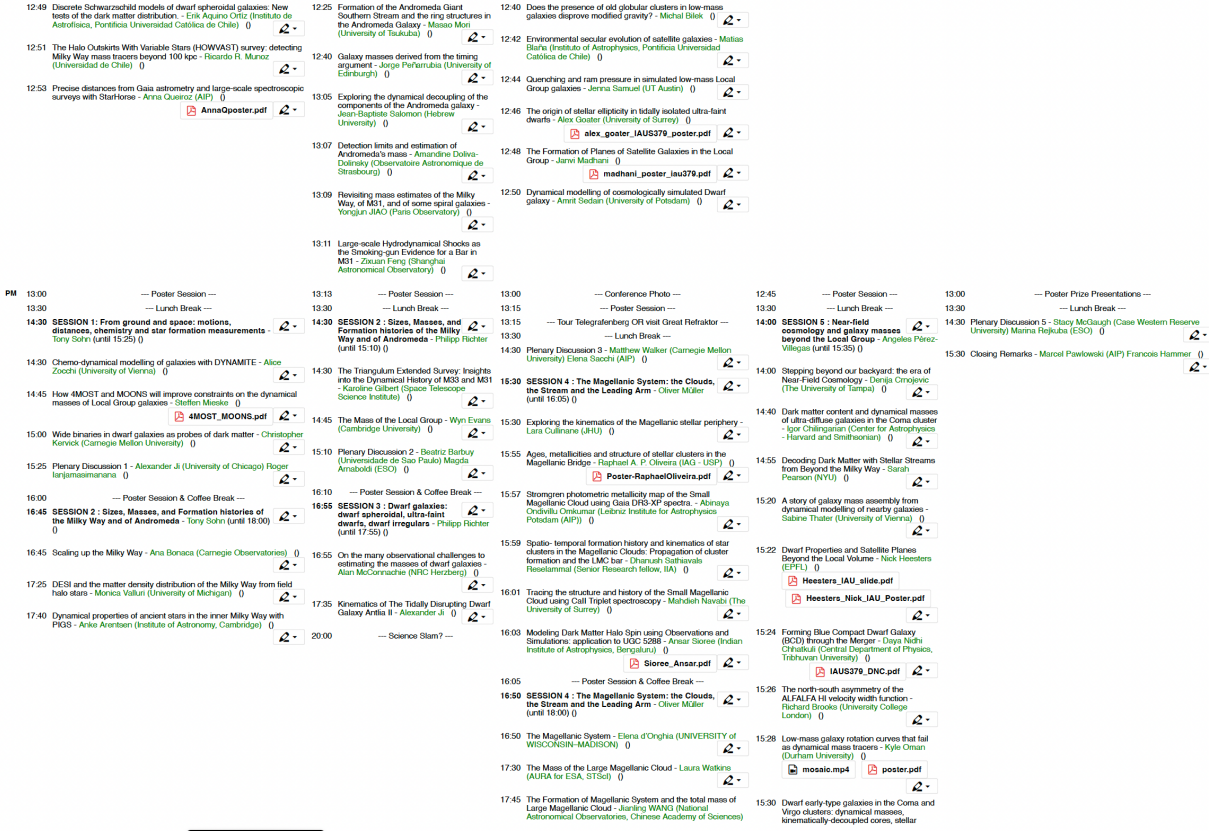

list of invited review speakers and session chairs, to be published in the IAU website;

Review speakers:
Dr Giuseppina Battaglia (IAC, Spain)
Dr Ana Bonaca (Carnegie, USA)
Dr Souradeep Bhattacharya (IUCAA, India)
Dr Alan McConnachie (U. Victoria, Canada)
Dr Elena d'Onghia (U. Wisconsin, USA)
Dr Denija Crnojevic (U. of Tampa, USA)
Dr Federico Lelli (INAF, Italy)

Session chairs:
Dr Michelle Collins (U. Surrey, UK)
Dr Alan McConnachie (U. Victoria, Canada)
Dr Magda Arnaboldi (ESO)
Dr Ekta Patel (UC Berkeley, USA)
Dr Laura Watkins (AURA/ESA, STSci, USA)

Gender ratios:

- 4 female/ 4 male/ 0 non-specified speakers invited review talks
- 4 female/3 male/ 0 non-specified invited speakers accepted
- 19 female/ 34 male/ 0 non-specified speakers contributed talks

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Summary of the scientific highlights of the meeting

From 20 to 24 March, 150 participants from 25 countries over all continents have met in Potsdam for the *IAU* Symposium *379* “Dynamical Masses of Local Group galaxies". The meeting included 5 different sessions, beginning with methodological questions, then, the Milky Way and Andromeda galaxies, the dwarf galaxies, the Magellanic system, and finally, the galaxies surrounding the Local group. Sessions have been systematically followed by intensive and open discussions about the major concerns in astrophysics, from the understanding of our Galaxy, of what is a galaxy, and how they are filled of dark matter.

An important number of new discoveries has been revealed during through almost one hundred talks (all posters have been presented in short talks), which include new mass estimates of different galaxies, astonishing results about an unexpected distribution of stars in the very outskirts of dwarf galaxies, first ever made measurements of tangential motions in the Andromeda system, together with new propositions on the nature of dwarf galaxies, for the overall mass of the whole Local group, and perhaps of its gas content.

Young participants have given many talks and have participated to all debates, sharing their opinions, and not hesitating to bypass mainstream opinions. For all participants, the meeting has been a great success, and it will be a special date in the field of local galaxies, as well as, more generally in cosmology. A general agreement has been also reached to facilitate the communication between astronomers by using a more common definition of the galaxy mass, and an agreement about what is in equilibrium, and what is not.

Besides attracting the most well-known scientists in the field, the IAU 379 Symposium has given new opportunities for many young astronomers. This is also true for several scientists coming from less developed countries (e.g., Nepal, Madagascar, India, Iran among others), who have often benefited of an IAU grant support. It may lead to new initiatives to establish or strengthen astronomy in these countries, and we hope that many actions will be undertaken for this in the near future, after the IAU 379 Symposium.

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An Executive Summary of the Meeting

Amongst the most stringent limitations in astronomy and cosmology are the very large uncertainties on galaxy masses and sizes. Yet, this topic is undergoing a revolution due to increasing knowledge of 6D space-velocity data for galaxies in the Local Group. This is driven by Gaia and numerous accompanying surveys that provide an accurate Milky Way rotation curve, detailed orbits of the nearby dwarf galaxies, and first estimates of the motions of dwarf irregulars and in the M31 system. This IAU Symposium has a very focused goal: Determining the mass of galaxies from dwarfs to giant spirals.

However, it addresses a very broad range of astronomical fields (from studies of variable stars for estimating distances to dynamical modeling), of wave-lengths to be investigated (from radio and optical for estimating the HI gas and stellar content and their motions, to X-rays for estimating the warm and hot ionized gas), and has major implications for a fundamental question (from the distribution and nature of dark matter to alternative models). Measuring galaxy masses at different scales in the Local Group impacts a broad range of astronomy, from stars, star clusters, to the Milky Way, distant galaxies, and Cosmology.

Key topics:

- Astrometry and 3D velocities: Gaia and HST
- Distances, Chemistry & Star formation in the Local Group: large surveys of resolved stars
- The Galaxy mass and size: rotation curve, halo stars, globular clusters
- Galactic halo dwarf spheroidal and ultra-faint dwarfs
- Magellanic System: the Clouds, the Stream and the Leading Arm
- Dwarf irregular galaxies: dynamics, ram pressure effects
- Andromeda System: rotation curve, halo dwarfs
- Galaxy formation: histories of the Milky Way, of Andromeda, compared to field galaxies
- Near field cosmology: galaxy dynamics, dark matter content, cosmological models