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Dynamics of the Oort cloud and formation of interstellar comets

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List of publications

Refereed papers

1. *Dynamical evolution of exo-Oort clouds around the Sun's closest neighbour stars due to local stellar perturbations and the Galactic tidal field*, submitted to *Astronomy & Astrophysics*, in review, 2020.
S. Torres, S. Portegies Zwart, and A. G. A. Brown.
2. *Dynamical evolution of the solar system debris disk in its birth cluster*, submitted to *Astronomy & Astrophysics*, recommend for publication, 2019b.
S. Torres, M. X. Cai, D. Mukherjee, S. Portegies Zwart, and A. G. A. Brown.
3. *Galactic tide and Local Stellar Perturbation on the Oort Cloud: Creation of Interstellar Comets*, *Astronomy & Astrophysics* 629 - A139, 2019a.
S. Torres, M. X. Cai, S. Portegies Zwart, and A. G. A. Brown.
4. *The Origin of Interstellar Asteroidal Objects Like 1I/2017 U1 'Oumuamua*, *Monthly Notices of the Royal Astronomical Society (MNRAS)* 479, L17-L22, 2018.
S. Portegies Zwart, **S. Torres**^{*}, I. Pelupessy, J. Bédorf, and M. X. Cai.

Co-author

1. *Once upon a time in the Oort cloud*, submitted to *Science*, 2020.
S. Portegies Zwart, **S. Torres**, A. G. A. Brown, and M. X. Cai.
2. *Evolution of the Outer Planets and Planetesimals due to Gas Drag in Transition Disks*, APS id. C9.006, 2014.
S. Navarro, M. Reyes-Ruiz, H. Aveves, C. Chavez, **S. Torres**.
3. *Effect of a Gaseous Transition Disc on Planetesimal Driven Migration*, DPS #45, id.415.05, 2013.
M. Reyes-Ruiz, H. Aceves, C. Chavez, **S. Torres**.

^{*}Equal contribution as the first author.

4. *The Transneptunian Automated Occultation Survey (TAOS II)*, Asteroids, Comets, Meteors, No. 1667, id.6111, 2012.
M. J. Lehner, S.-Y. Wang, P. Ho, T. Lee, Z.-W. Zhang, W.-L Yen, M. Reyes Ruiz, D. Hiriart, A. P. Granados, **S. Torres**, C. Alcock, A. Szentgyorgyi, J. C. Geary, T. Norton, G. Furesz.

Conference proceedings

1. *Dynamics of the Oort cloud in the Gaia era I: close encounters*, IAU-330 Gaia symposium, 2017.
S. Torres, S. Portegies Zwart, and A. G. A. Brown.
2. *Dynamics and habitability in very low mass stars that belong to stellar clusters*, Astrobiology Science Conference, 2015.
S. Torres & B. Pichardo.
3. *Dynamics of protoplanetary disk in stellar clusters: very low mass stars*, ADELA, 2015.
S. Torres & B. Pichardo.

In preparation

1. *Dynamics of low mass stars in different Galactic environments*, in preparation, 2020.
S. Torres.
2. *Debris disk survivability around very low mass stars*, to be submitted to MNRAS, 2020.
S. Torres & B. Pichardo.
3. *Stellar cluster characterization using artificial intelligent methods to predict Gaia observables*, in preparation, 2020.
J. Albert, **S. Torres**, and S. Portegies Zwart.

Curriculum Vitae

I was born in Mexico city approximately 32 years ago. When I was a child, I was curious about everything, and always asked myself how the things work?. In particular, I was fascinated with one story that my parents used to tell me: *The mystery of the three stars on the sky*, that mysteriously appeared only during Christmas. For so many years, I tried to find the answer to such an event but did not succeed (although I was very close). When finally I entered to the secondary school, I asked my physics teacher, and his answer was: “To disentangle such a mystery you have to become an Astronomer, but in order to do that you have to study first a bachelor degree in Physics, a master degree in Astrophysics and finally a PhD in Astrophysics”, and then the journey who brought me here began.

In 2006 I enrolled in the National Autonomous University of Mexico (UNAM) to study Physics. The first years were tough, but quickly I adapted to the rhythm. In my second year, I went to the Institute of Astronomy to offer my services as a student. The result of that visit completely changed my life. I met Barbara Pichardo, who after a small interview offered me to supervise my bachelor thesis and more important her friendship. With Barbara’s support, I participated in several international projects like APOGEE and TAOS-II. In 2012 I moved to Taipei as part of the scientific team of TAOS-II at the Academia Sinica Institute of Astronomy and Astrophysics (ASIAA). After a successful internship in Taiwan and as a part of the next step in the list to become an Astronomer. At the end of 2012, I won a scholarship from the Spanish government to enrol in the master in Astrophysics at Universidad Autónoma de Madrid - Universidad Complutense de Madrid where I worked closely with Eva Villaver.

Curriculum Vitae

In the fall of 2015, I was notified that I was awarded a fellowship from the Mexican National Council for Science and Technology (CONACYT) for PhD studies abroad. After several meetings with Anthony Brown and a lot of bureaucracy finally, in November 2015, I landed in Schiphol. Full of dreams and enthusiasm I started my PhD in Astrophysics (and the last step in my list) at Leiden Observatory under the supervision of Anthony Brown and Simon Portegies Zwart. During four years, I travelled the world, talked, collaborated and shared with wonderful people and scientists, and I explored the origin and evolution of the outer solar system.

In February 2020, I accepted a postdoctoral fellowship at the University of California, Los Angeles (UCLA) in USA. I will join Smadar Naoz's research group, and I will continue the journey that I started many years ago: discover the universe.

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About four years ago, I came to the Netherlands to pursue my PhD. I never imagined that my life will completely be changed along these years. I met wonderful people and scientists whose support, advice and friendship helped me to achieve my goal. I will always be grateful to all of you that were with me in one way or another in my PhD journey. Especially, I would like to thank...

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**–The Universe which, in the supremeness of its
symmetry, is but the most sublime of poems.**

Eureka [extract], Edgar Allan Poe 1848.

