Exoplanet hosting stars give further insights on planet formation

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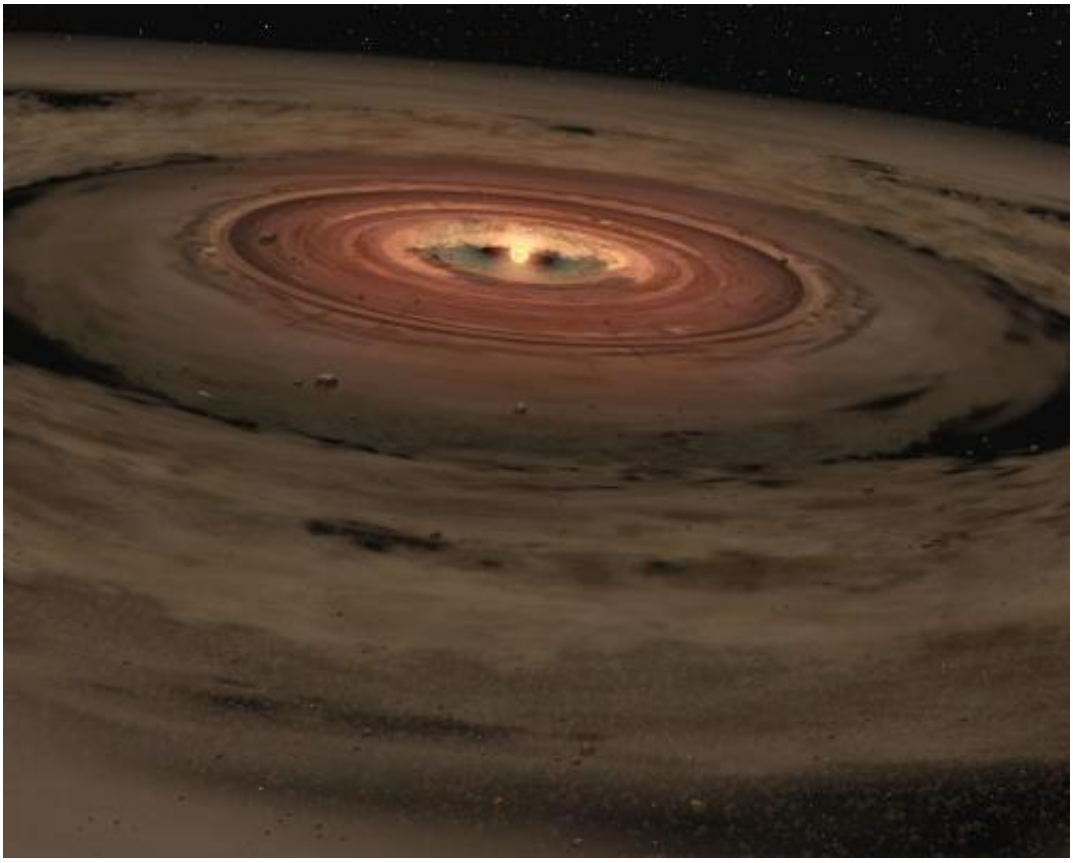

Swirling disk of planet-building dust. (Credit: NASA/JPL-Caltech/T. Pyle (SSC)

An international team, led by EXOEarths researchers (Centro de Astrofísica da Universidade do Porto), proposes that metals like magnesium might have an important role in the formation of low mass planets.

The team, lead by CAUP researcher Vardan Zh. Adibekyan, analyzed high resolution spectra of 1111 sun-like stars, obtained by the HARPS spectrograph (ESO). Of these stars, 109 are known to harbor high mass (Jupiter-like) planets, and 26 have Neptune-like planetary companions.

The team focused especially on studying the abundance of Alpha Elements in these stars, like Magnesium (Mg), Silicon (Si) or Titanium (Ti). The research found that the ratio of these, compared with the amount of Iron (Fe), was consistently higher in stars with planets, with the greatest discrepancy observed for Mg.

The lead author of the paper, CAUP Astronomer Vardan Zh. Adibekyan commented “These findings indicate that some metals other than iron are involved in the process of planet formation, especially when the amount of iron is lower than solar. These results may provide strong constraints for the models of planet formation, especially for planets with low mass.”

The leading theories of planet formation suggest that planets form by clumping smaller particles of heavy elements (metals), into larger and larger bodies. The results put forward by the present study suggest that planets need a minimum amount of “metals” to be formed. The formation of planets, even the lowest mass ones, is dependent on the dust content of the cloud that gave origin to the star and planetary system.

More information: "Overabundance of alpha-elements in exoplanet-hosting", Vardan Zh. Adibekyan, Nuno Cardoso Santos, Sérgio Sousa, Garik Israelian, Elisa Delgado Mena, Jonay González Hernández, Michel Mayor, Christophe Lovis, Stephan Udry. *Astronomy & Astrophysics* Volume 543, July 2012, Article Number A89 (DOI: 10.1051/0004-6361/201219564).