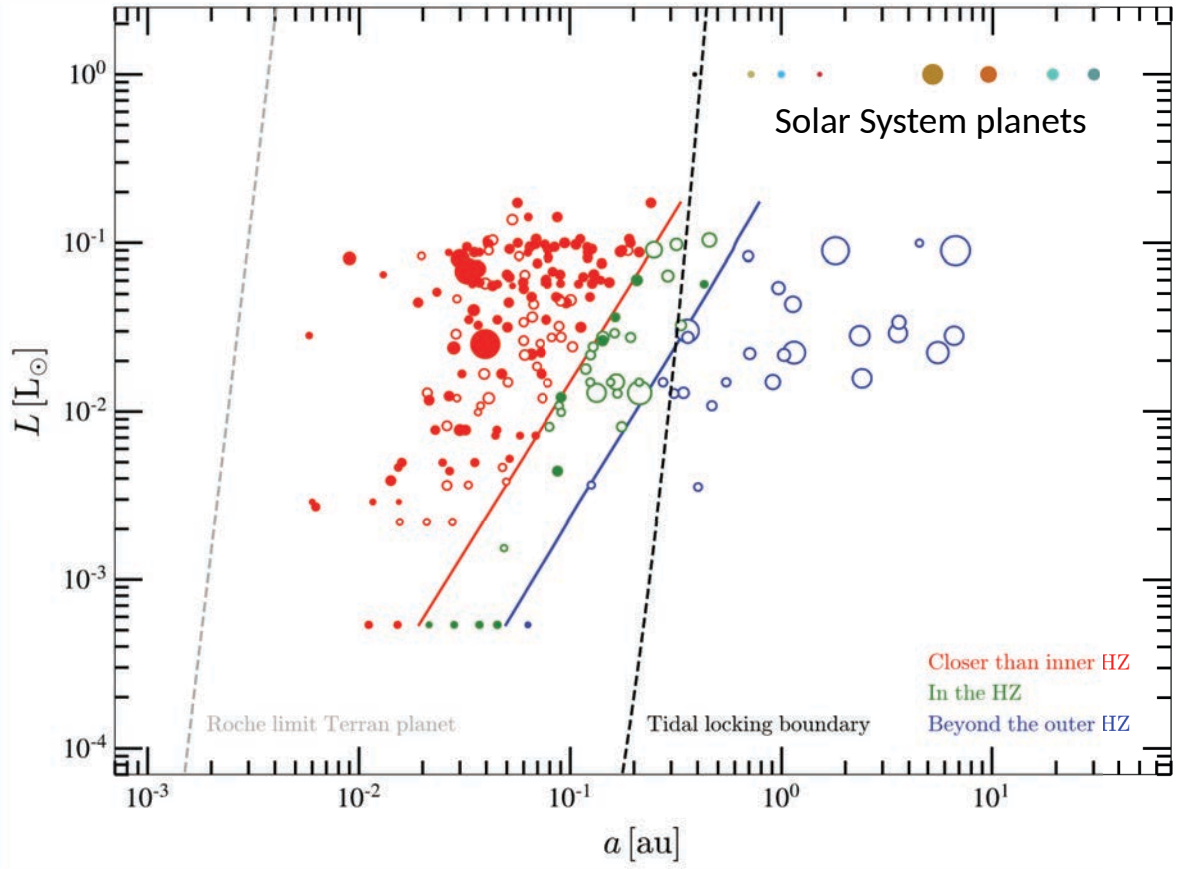
Exomoons in the habitable zones of M dwarfs



Conservative habitable zones for the 109 M dwarfs in our study (in green). The dashed, gray line is the Roche limit for an Earth-like planet, or the separation at which the planet would disintegrate due to its host star gravity. The dashed, black line outlines the tidal locking scenario for a 10 M⊕-planet after 1 Ga.

M dwarfs are stars of very low masses and luminosities, yet are the most common type of star and host most of the exoplanets in the local Milky Way. We analyse the most up-to-date list of known M-dwarf exoplanet hosts: 109 stars with 205 orbiting exoplanets.

We investigate the potential habitability, stability, and detectability of exomoons around these exoplanets. For each planet, we retrieve or derive their masses and radii, calculate the long-term dynamical stability of hypothetical moons, and identify those planets that can support habitable moons.

After computing the luminosities of 109 stars, we find that 33 exoplanet candidates are located in the habitable zones of their host stars. Exomoons around these planets could themselves be shelter for life for long timescales and thus may be targets for biosignature surveys.

Of the 33 exoplanet candidates, four of them could host Moon- to Titan-mass exomoons for timescales longer than the Hubble time. Some of these moons might be detected with current and near-future technology, with special attention to those exomoons in exoplanets known to transit their stars.

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