

Unveiling free-floating binary planets with Gaia-NIR astrometry

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Planetary mass objects and brown dwarfs have been shown to exist both associated to stellar objects and as isolated, free-floating objects in the field. While the multiplicity of isolated brown dwarfs was found to be smaller than that of low mass stars, extending the trend of binary fraction with the mass of the primary observed in the stellar regime (Fontanive et al. 2023), a turnover in binary fraction was observed very recently for planetary-mass objects in the Trapezium cluster (Pearson & McCaughrean 2023). This points to a specific mechanism for the formation of binary objects of planetary masses. Theoretical efforts to explain the formation of binary planets both bound to the central star and free-floating are being performed (e.g. Konijin et al. 2023; Portegies Zwart et al. 2023; Lazzoni et al. 2024). The Gaia-NIR space mission may allow a deeper view of the multiplicity of low-mass substellar objects, extending to closer separations the emerging results for visual companions. Objects in different environments, such as nearby young associations and open clusters could be explored, allowing the study of the impact of stellar density.

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