Stellar multiplicity, eclipsing binaries and PLATO planets

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**Description:**

PLATO2.0 is a medium-class ESA mission due for launch in 2026 that will search for earth-like exoplanets in the habitable zone of sun-like stars by the transit method (Rauer et al 2014). The Open University is part of the PLATO consortium and is contributing to the PLATO development phase, by studying the impact of astrophysical false positives that will contaminate the sample of exoplanet candidates delivered by PLATO.

This PhD research project will sit alongside the PLATO development work and consider the effect higher-order stellar multiplicity and planetary multiplicity have on the population properties of eclipsing binary surveys, and on exoplanet transit surveys. Existing population synthesis codes (Rowden et al 2017, Farmer et al 2013, Willems et al 2011) will be extended to take into account the evolution of triple stars and hierarchical quadruples; this includes the addition of orbital eccentricity as an evolutionary parameter. The population simulations will be validated using the second data release (DR2) of the Gaia mission (Gaia Collaboration 2016a, b) which will become available from Spring 2018. The resulting population models will lead to a re-evaluation of eclipsing binary databases to assess the ubiquity of stellar multiplicity, and contribute to a better understanding of the statistical properties of planetary systems.

**References:**

   [http://adsabs.harvard.edu/abs/2013MNRAS.433.1133F](http://adsabs.harvard.edu/abs/2013MNRAS.433.1133F)
   [http://adsabs.harvard.edu/abs/2016A%26A...595A...2G](http://adsabs.harvard.edu/abs/2016A%26A...595A...2G)
   [http://adsabs.harvard.edu/abs/2016A%26A...595A...1G](http://adsabs.harvard.edu/abs/2016A%26A...595A...1G)
   [http://adsabs.harvard.edu/abs/2014ExA....38..249R](http://adsabs.harvard.edu/abs/2014ExA....38..249R)
5. Rowden et al 2017, [poster](http://warwickplato.com/poster) presented at Warwick PLATO Science Meeting

**Qualifications required:**

First degree in astronomy or in a closely related field.