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Beyond the Solar System: methods of detection, characterisation, and classification of exoplanets

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Solicited talk

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Since the first extrasolar planet detection in 1992, exoplanetary science has experienced exponential growth. To date, about 6000 planets have been detected beyond the Solar system, and these detections have greatly advanced our understanding of planetary systems' formation and evolution, as the population of exoplanets is rather different from what we know from the Solar System, both in terms of planetary types and planetary architectures. Thus, the first ever detected exoplanet represents a so-called Hot Jupiter -- the giant planet orbiting in close proximity to its host star, which planets turned out to be astonishingly common. Furthermore, the majority of exoplanets known to date represent the planets with masses between those of the Earth and Neptune, spreading the wide range of densities, the type of planets absent in the Solar System. In my talk, I will briefly overview the main exoplanet detection and characterisation methods used today and discuss the main trends in exoplanetary population statistics and their implications for planetary formation and evolution modeling. To conclude, I will present some highlights on the studies of exoplanetary (upper) atmospheres and the information one can gain thereof from recent and future observational missions.