



Contribution ID: 448

Type: **Talk**

Millisecond pulsars: on their own, with a friend, or even two

Wednesday 16 December 2015 14:00 (30 minutes)

As the most rapidly rotating stars known, millisecond pulsars continue to enjoy great scientific interest and broad impact. They acquire their millisecond rotational periods through mass transfer from a binary stellar companion; via their radio, X-ray and/or gamma-ray pulsations we can precisely time their spin rate and orbital motion around a companion object (or even multiple companions). Millisecond pulsars are thus not only exotic stars in their own right, but also precision astronomical clocks for measuring other physical effects in extreme environments. In this review talk, I will discuss how the large recent increase in known millisecond pulsars is shaping our understanding of their formation/evolution and is enabling ever more constraining tests of gravitational theories and dense matter physics.

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Session Classification: 15 - Binaries