



Contribution ID: 41

Type: **Talk in a parallel session**

The massive fast spinning white dwarf in the HD 49798/RX J0648.0–4418 binary

Monday, 8 July 2024 15:00 (30 minutes)

I will review the properties and discuss some of the puzzling aspects of the unique binary system composed by the luminous hot subdwarf HD 49798 and a white dwarf of 1.220(8) solar masses and spin period of 13.2 s. This is one of the few massive white dwarfs with a dynamically measured mass and the one with the shortest spin period. It emits pulsed X-rays with a very soft spectrum, powered by accretion from the tenuous stellar wind of its companion of sdO spectral type. The current level of mass accretion cannot provide enough angular momentum to explain the precisely measured spin-up rate (71.9(6) nanoseconds per year), which is instead best interpreted as the result of the radial contraction of this young white dwarf. The higher mass transfer rate expected during the future evolutionary stages of HD 49798 will drive the white dwarf above the Chandrasekhar limit, but the final fate, a type Ia SN explosion or the collapse to a millisecond pulsar, is uncertain.

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Session Classification: Massive white dwarfs and related phenomena

Track Classification: Compact Objects and Stellar Evolution (CO): Massive white dwarfs and related phenomena