



# - RAY ASTRONOMY 2019

*Current Challenges and New Frontiers in the Next Decade*

8-13 September 2019  
CNR/INAF Research Area, Bologna, Italy

Contribution ID: 96

Type: **Poster**

## A young, contracting white dwarf in the peculiar X-ray binary HD49798/RX J0648.0–4418

*Friday, 13 September 2019 15:32 (2 minutes)*

HD49798/RX J0648.0–4418 is the only known binary composed of a hot subdwarf star and an accreting neutron star or white dwarf. We discovered that the compact objects has a spin period of 13.2 s and is spinning up at a rate of  $2 \times 10^{-15}$  s/s.

The precise distance of 508 pc recently measured with Gaia strongly disfavours the possibility that the pulsar be a neutron star. On the other hand, the accretion rate occurring in this system is too small to cause such a rapid spin-up in a white dwarf. We show that the spin-up is instead well explained by the decreasing moment of inertia of a massive white dwarf with an age of only  $\sim 2$  Myrs, still in the early contracting phase. Radial contraction in the early phase of white dwarf evolution is predicted by the theoretical models, but it has never been observed before.

Binary evolution computations show that several hundreds of systems with a white dwarf orbiting a hot subdwarf similar to HD49798 exist in the Galaxy and many of them can be revealed by future X-ray missions.

### Topic

Compact and diffuse sources in galaxies and in the Galactic Center

### Affiliation

INAF, IASF-Milano

**Primary authors:** MEREGHETTI, Sandro (Istituto Nazionale di Astrofisica (INAF)); Prof. POPOV, Sergei; BLINNIKOV, S.I.; KURANOV, A.G.; YUNGELSON, L.R.; PINTORE, Fabio (Istituto Nazionale di Astrofisica (INAF)); Dr ESPOSITO, Paolo (INAF-IASF Milano); LA PALOMBARA, Nicola (Istituto Nazionale di Astrofisica (INAF)); Dr TIENGO, Andrea (IUSS Pavia); ISRAEL, GianLuca (Istituto Nazionale di Astrofisica (INAF)); Dr STELLA, Luigi

**Presenter:** MEREGHETTI, Sandro (Istituto Nazionale di Astrofisica (INAF))

**Session Classification:** POSTER SESSION