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# Modelling the polarisation signatures detected from the first white dwarf pulsar AR SCO.

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Marsh et al. (2016) detected radio and optical pulsations from the binary system AR Scorpii(AR Sco). This system, with a orbital period of 3.55h, is composed of a cool, low-mass companion star and a white dwarf with a spin period of 1.97min. Optical observations by Buckley et al. (2017) showed that the polarimetric emission from the white dwarf is strongly linearly polarised (˜ 40%) with periodically changing intensities. This periodic emission is thought to be powered by the highly magnetised (5*10<sup>8</sup> G) white dwarf that is spinning down. The morphology of the polarisation signal is similar to that seen in the Crab pulsar. All these observations plus the lack of any obvious sign of accretion lead us to believe that this is the first observed white dwarf pulsar, bringing a lot of excitement to the field of pulsar physics.

A next step is to investigate if known neutron star pulsar models are applicable to describe the white dwarf pulsar's polarimetric signatures. We applied the Rotating Vector Model (RVM; Radhakrishnan and Cooke 1969) to model the polarisation swing of the white dwarf pulsar. We also conducted a parameter study using a Markov chain Monte Carlo method, making it possible to constrain the magnetic inclination angle &alpha and the impact angle &beta = &zeta - &alpha, with &zeta the observer angle. Here, we present first results of such constraints. In the future, we will apply more detailed models to the polarisation swing data.

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