

Hadronic radiation from the rotation powered white dwarf within the binary system AR Scorpii

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Abstract content

AR Scorpii, close binary system of a rotation powered white dwarf and a low mass M type companion star, shows non-thermal emission extending up to the X-ray energy range. We propose that relativistic electrons and hadrons can be accelerated in a strongly magnetised, turbulent region formed in collision of a rotating white dwarf magnetosphere and a dense atmosphere of the M dwarf star. The non-thermal X-ray emission is produced either by the primary electrons or the secondary electron-positron pairs from decay of charged pions created in collisions of hadrons with the companion star atmosphere. We show that the accompanying gamma-ray emission (from decay of neutral pions) is expected to be on the detectability level of the present and/or the future satellite and Cherenkov telescopes.

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