X-rays from magnetic massive OB stars

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Abstract

The magnetic activity of solar-type and low-mass stars is a well known source of coronal X-ray emission. At the other end of the main sequence, X-rays emission is instead associated with the powerful, radiatively driven winds of massive stars. Indeed, the intrinsically unstable line-driving mechanism of OB star winds gives rise to shock-heated, soft emission (_˜0.5 keV) distributed throughout the wind. Recently, the latest generation of spectropolarimetric instrumentation has uncovered a population of massive OB-stars hosting strong, organized magnetic fields. The magnetic characteristics of these stars are similar to the apparently fossil magnetic fields of the chemically peculiar ApBp stars. Magnetic channeling of these OB stars' strong winds leads to the formation of large-scale shock-heated magnetospheres, which can modify UV resonance lines, create complex distributions of cooled Halpha emitting material, and radiate hard (_˜2-5 keV) X-rays. This presentation will summarize our coordinated observational and modelling efforts to characterize the manifestation of these magnetospheres in the X-ray domain, providing an important contrast between the emission originating in shocks associated with the large-scale fossil fields of massive stars, and the X-rays associated with the activity of complex, dynamo-generated fields in lower-mass stars.

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