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Flare QPPs in AB Dor: I. Identical scaling laws to solar and stellar flares and clues of magnetoacoustic waves

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AB Dor is an active rapidly rotating K0 dwarf which rotates ~ 50 times faster than the Sun. We have studied flare light curves from AB Dor using the archival observations from the XMM-Newton satellite and detected quasi-periodic pulsations (QPPs). Periods and damping times of QPPs are derived and compared to those for solar and other stellar flares. These parameters are generally found to be larger than those from the solar and other stellar QPPs. Kolmogorov-Smirnov (K-S) test reveals that the QPPs found in the post-flare light curves of AB Dor are similar to the previously reported solar and stellar QPPs. The scaling law of damping period with oscillation time of flare generated QPPs interestingly exhibit the same nature as observed in the flares at the Sun and other magnetically active solar-type stars. This implies that QPPs at AB Dor may have a similar origin as in the Sun and other active stars. Thus the physical origin can be attributed due to the magnetoacoustic modes. To the best of our knowledge, the present findings are the first evidence of the wave-generated QPPs observed at AB Dor, and we discuss its physical implications in its stellar coronae.

Student poster?

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