

Magnetic fields along the pre-main sequence: new magnetic field measurements of Herbig Ae/Be stars using high-resolution HARPS spectropolarimetry

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Abstract. Herbig Ae/Be-type stars are analogs of T Tauri stars at higher masses. Since the confirmation of magnetospheric accretion using Balmer and sodium line profiles in the Herbig Ae star UX Ori, a number of magnetic studies have been attempted, indicating that about 20 Herbig Ae/Be stars likely have globally organized magnetic fields. The low detection rate of magnetic fields in Herbig Ae stars can be explained by the weakness of these fields and rather large measurement uncertainties. The obtained density distribution of the root mean square longitudinal magnetic field values revealed that only a few stars have magnetic fields stronger than 200 G, and half of the sample possesses magnetic fields of about 100 G or less. We report on the results of our analysis of a sample of presumably single Herbig Ae/Be stars based on recent observations obtained with HARPSpol attached to ESO's 3.6m telescope. Knowledge of the magnetic field structure combined with the determination of the chemical composition are indispensable to constrain theories on star formation and magnetospheric accretion in intermediate-mass stars. As of today, magnetic phase curves have been obtained only for two Herbig Ae/Be stars, HD 101412 and V380 Ori.