

ABSTRACT ONLY

STELLAR ACTIVITY AT 500 MYR: X-RAY AND H-ALPHA MEASUREMENTS OF STARS IN M37
A. Núñez¹, M.A. Agüeros¹, M. López-Morales² and
K.R. Covey³

Oral presentation

In low-mass stars, the strength of the magnetic dynamo decreases with age and rotation, as stars spin down through loss of angular momentum via magnetized winds. Both coronal X-ray emission and chromospheric H α emission trace the strength of the magnetic dynamo and can be used to calibrate the evolution of stellar magnetic activity. This is key to quantifying the interplay between stellar rotation and magnetic field and understanding the magnetic heating mechanism on different stellar atmospheric layers. We observed the 500 Myr-old open cluster M37 with *Chandra* and MMT Hectospec instrument to obtain X-ray and H α measurements of its low-mass stars. We consolidate a comprehensive sample of ≈ 250 cluster members with X-ray detections, ≈ 250 with H α measurements, and ≈ 60 with both. We use rotation periods (P_{rot}) from the literature to calculate Rossby numbers, $R_o = P_{rot}/\tau$, where τ is the convective turnover time, and calculate ratios of X-ray and H α luminosity to bolometric luminosity, to minimize mass dependencies in our characterization of the rotation-magnetic activity relation at 500 Myr. With this data we explore whether the activity levels of fast and slow rotators (small and large R_o) differ between the X-ray and H α tracers and we quantify the activity-rotation relation at 500 Myr. This is the largest sample available for analyzing the dependence of coronal and chromospheric emission on rotation for a single-aged population.

¹ Department of Astronomy, Columbia University, 550 West 120th Street, New York, NY 10027, USA.

² Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02183, USA.

³ Department of Physics and Astronomy, Western Washington University, 516 High Street, Bellingham, WA 98225, USA.
