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Testing the accuracy of pre-main sequence stellar models with rotation, inflation, and lithium abundances

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Accurate ages of young (≤ 100 Myr), solar-type stars are of central importance to many questions in stellar astrophysics. But current methods for dating these objects remain imprecise and mutually contradictory. Perhaps the most reliable method for cluster dating is the lithium depletion boundary technique, however the precision of individual Li-based stellar ages remains limited. An alternative comprises direct comparisons between stellar observables (e.g. Teff, luminosity, radius) and evolutionary models, but such models sometimes under-predict stellar radii by ~10%, thus leading to inaccurate age measurements. In this talk, I review the theoretical justification for treating Li as a sensitive age indicator and highlight recent results of pre-main sequence Li depletion. I also discuss the empirical evidence for radius inflation in active stars young and old, and review theoretical efforts to model this effect though internal magnetic fields and starspots, using Li as a constraint.

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