

SAN DIEGO STATE UNIVERSITY DEPARTMENT OF PHYSICS AND DEPARTMENT OF
ASTRONOMY COLLOQUIUM

Speaker: Prof. Adam Burgasser -- University of California, San Diego

Topic: Lithium in Halo L Subdwarfs: Using Nearby Brown Dwarfs to Probe Li
Production in Big Bang Nucleosynthesis

Time: 3:00 PM, Friday, November 14, 2014 (refreshments served at 2:45 PM)

Place: Room 215, Physics-Astronomy Building (PA-215)

Abstract:

Since the first brown dwarf discoveries, the 670.8 nm Li I line has been used as an indicator of substellar mass, based on the destruction of this element at core temperatures below that of hydrogen fusion, and the fully convective nature of cool dwarf interiors. Among L-type dwarfs (1500–2200 K) in the vicinity of the Sun, the observed incidence of Li absorption increases significantly as a greater fraction of these objects are brown dwarfs, but the line disappears in the T-type dwarfs (500–1500 K) due to conversion of Li to LiCl and LiOH. For substellar members of the Galactic halo population, Li I should be a prominent feature as its abundance is tied to primordial, rather than stellar, production. Furthermore, models predict the Li burning minimum mass to increase in metal-poor dwarfs. Over the past decade, a handful of metal-poor L subdwarfs have been identified whose kinematics are consistent with membership in the Galactic halo population. These are the most promising targets to search for Li I absorption in halo brown dwarfs. In this talk, I describe a sensitive search for Li I in two mid-type L subdwarfs with halo kinematics using the GTC and VLT. We report a tentative indication of weak Li I absorption in one source, consistent with significant (but not complete) depletion. I discuss the implications of this possible detection and future prospects for using the Li test in halo brown dwarfs.