RIT College of Science
Physics and Center for Detectors Colloquium

Dr. Christoph Baranec
California Institute of Technology

Tuesday, April 30, 2013
12:00 – 1:00 pm
The Chester F. Carlson Center for Imaging Science, Room 1275

Robotic, Extreme & Beyond: Rayleigh Laser Guide Stars Pioneering the Next Decade of Astronomical Adaptive Optics

Rayleigh laser guide stars are currently enjoying a resurgence in the field of astronomical adaptive optics - enabling unique cutting edge science for even the largest of telescope apertures. I will outline the advantages of the Rayleigh laser architecture for compensating the effects of the turbulent atmosphere and detail current and future systems that exploit these lasers to their fullest, including: Robo-AO, the world's first robotic adaptive optics system which is able to observe an unprecedented 200+ targets at the visible diffraction-limit in a single night; PULSE, an upgrade to the PALM-3000 exo-planet adaptive optics system which will allow it to directly search for planets around much fainter (and more numerous) M-dwarf stars; and several ground layer adaptive optics systems which use multiple Rayleigh laser guide stars to correct for fields of view of up to 1 degree.

Christoph Baranec is an optical scientist (Ph. D., U. Arizona, 2007) and astronomer (B.S., Caltech, 2001) specializing in adaptive optics systems, components and techniques. Currently a postdoc Caltech, he has lead an international effort to build the world's first highly efficient robotic laser adaptive optics system (Robo-AO; http://robo-ao.org) and is using it for a variety of astronomical science projects. Past research includes the development of the Palomar PALM-3000 visible-light extreme adaptive optics system, recently used to take simultaneous spectra of four extra-solar planets, as well as the MMT multiple-laser wide-field adaptive optics system.