SOFIA Lunch Talk

Date: May 15, 2006

Speaker: V. Strelnitski (and many students)

Title: "Nine-Year Monitoring of MWC349 in Radio and Optics."

Abstract:

MWC349 is a unique emission-line star – the only known natural hydrogen maser and the only known natural IR laser. Maser and laser radiation is generated in the ionized "skin" of the neutral, edge-on circumstellar disk that is probably in the stage of planet formation. So, this object is interesting both as a unique, or very rare, physical phenomenon (natural lasering), and as a rare astrophysical phenomenon (proto-planetary disk). The Maria Mitchell Observatory has monitored this variable object for nine years, quasi-simultaneously in optics (BVRI) and radio (thermal and masering hydrogen recombination lines). Some of the results (such as the correlation of optical and radio emission) can be readily interpreted in the framework of the current model of a disk being "photo-evaporated" by a hot central star. Some other results (such as possible quasi-periodic variations of optical radiation with a period of 3 +/- 0.3 years) remain unexplained. I will discuss the modifications of the current model implied by our long-term monitoring; possible future observations of MWC349 in different spectral domains, including observations from SOFIA; and some theoretical topics, such as the cause of the rarity of natural lasers as compared with masers.