MUSICOS 92 OBSERVATIONS OF θ^2 TAURI

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MUSICOS (**MU**lti-**SI**te **CO**ntinous **S**pectroscopy) is an international collaboration interested in areas of astronomical research requiring continuous, high-resolution spectroscopy. The MUSICOS stategy has been 1) to organize international campaigns (Catala et al 1993), 2) to build a prototype fibre-fed, high-resolution, echelle spectrograph (Baudrand & Böhm 1992), and 3) to install duplicates of the MUSICOS spectrograph on 2m class telescopes around the world. Stages 1 and 2 have been completed. Preliminary results on θ^2 Tau from the second MUSICOS campaign are presented here.

The δ Scuti star θ^2 Tau is a spectroscopic binary and a member of the Hyades cluster. Stellar evolution models of the binary system have been derived from well-constrained observational parameters (Królikowska 1992). θ^2 Tau is an excellent candidate for stellar seismology as extensive photometric observations have indicated that its oscillations are multiperiodic (Breger et al 1989). However, the theoretical frequency spectrum is rich and the identification of oscillation modes from photometry is difficult. To circumvent this problem, multi-site spectroscopic observations were planned. With nearly complete coverage of the Doppler-broadened line-profile variations, the frequencies and modes of oscillation can be determined.

Time series observations of θ^2 Tau were obtained from sites in China, OHP, the Canary Islands, and Kitt Peak satisfying requirements of high resolution ($R > 30,000$, minimum 20,000), high signal-to-noise ($S/N > 500$, minimum 100) and good time sampling ($t_{exp} < 600$ sec, maximum 1200 sec). Nearly complete coverage was obtained during four days of observation.

Low- and high-degree modes of oscillation appear as variations in radial velocity and line-profile shape. Frequencies established by previous photometric campaigns at 13.2, 13.7 and 14.3 cycles per day were rederived from the radial velocity variations. The line-profile variations were analyzed using a two-dimensional Fourier technique (Kennelly et al 1992) to reveal modes of oscillation possibly as high as $|m| = 8$ at frequencies between 12 and 17 cycles per day (Figure 1).

Much of the credit for the success of this campaign belongs to the MUSICOS observers: Claude Catala, observer at the 1.5m OHP telescope, Bernard Foing, Zhao Fuyuan, and Jiang Shiyang, observers at the 2.16 Xinglong telescope, Eric Houdebine, observer at the 4.2m WHT telescope, and Jim Neff, observer at the 1.5m McMath telescope. Other participants in the cam-

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paign were J. Baudrand, T. Böhm, J. Butler, B. Carter, A. Collier Cameron, G. Cutispo, J. Czarny, J.-F. Donati, K.K. Ghosh, L. Huang, D. Rees, M. Rodono, M. Semel, T. Simon, A. Welty, and D. Zhai.

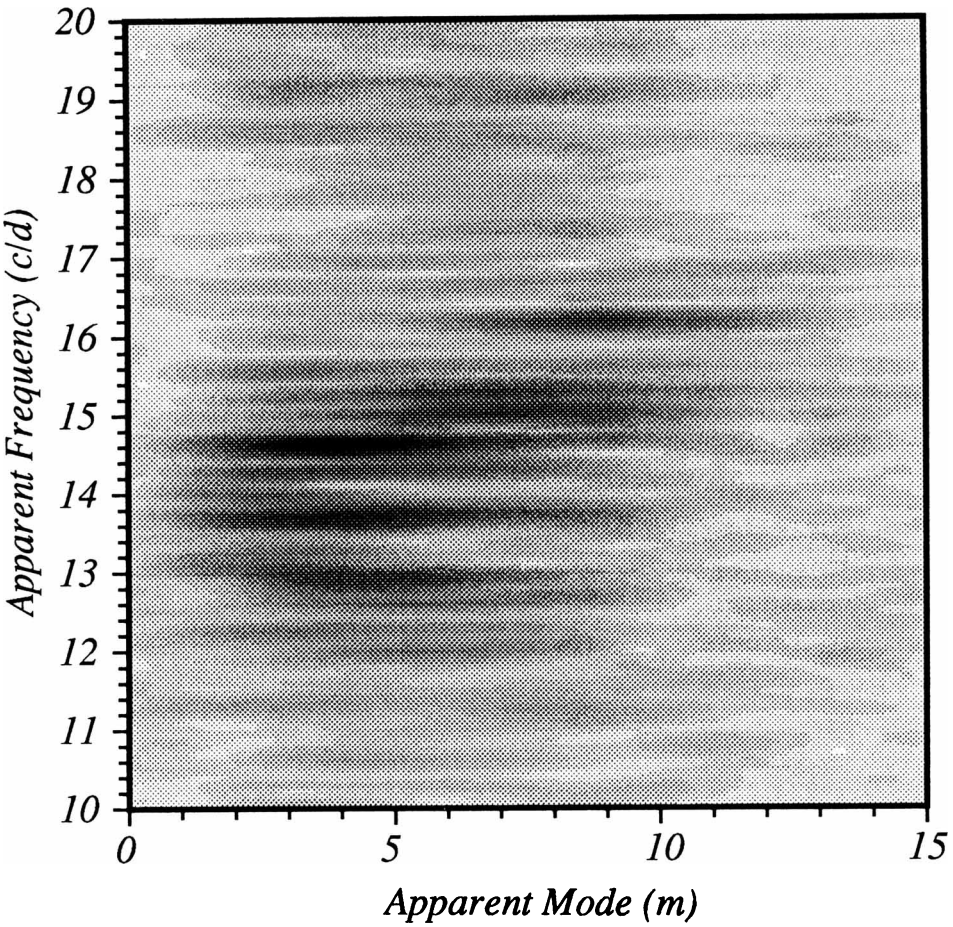

Figure 1. Fourier Representation of Line-Profile Variations. Residual variations within line profiles were mapped onto a system of angular coordinates and transformed in both time and space.

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