

STEPHI: A NEW APPROACH TO δ SCUTI ASTEROSEISMOLOGY

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THE STEPHI NETWORK

The STEPHI network (STellar PHotometry International) is a multinational cooperation established in order to get as perfect data as possible on several δ Scuti stars, within a reasonable period of time. STEPHI is currently integrated by nearly 15 people, belonging to the first four institutions cited above. However, astronomers of other institutions have eventually contributed to the network. The idea was born in 1986 and the network has been working to full operation since August 1989. A campaign, observing one or two δ Scuties is normally undertaken every 15 months. They are usually order of three weeks long, avoiding full-moon periods. Up to now, four campaigns have been performed, the last ending February 1992.

Very good outcomes on five δ Scuties [63 Herculis in June 1987 (Belmonte et al, 1991), GX Pegasi in September 1989 (Michel et al, 1992a), v650 Tauri in November 1990 (Belmonte and Michel, 1991; Michel et al, 1992b) and, finally, BN Cancri and BU Cancri in February 1992] have been obtained. Indeed, some very useful additional information on comparison stars (see e.g. Belmonte et al, 1990) and sky conditions (transparency, brightness, scintillation, etc...) has been obtained as well. Additionally, some key information about mostly all multiperiodic (four or more periods) δ Scuti stars studied up to March 1992, with good quality data, is presented in this report.

A preliminary analysis of last campaign data has been performed. Both

stars show a very probable multiperiodic behaviour [they were already known δ Scuti stars (Kovács, 1981; Bossi et al, 1982)]. Dominant periods found for BNCnc are 52 and 59 minutes, whilst the highest peak found for BUCnc corresponds to a period of 76 minutes. A much deeper analysis is currently undertaken at the different intitutions.

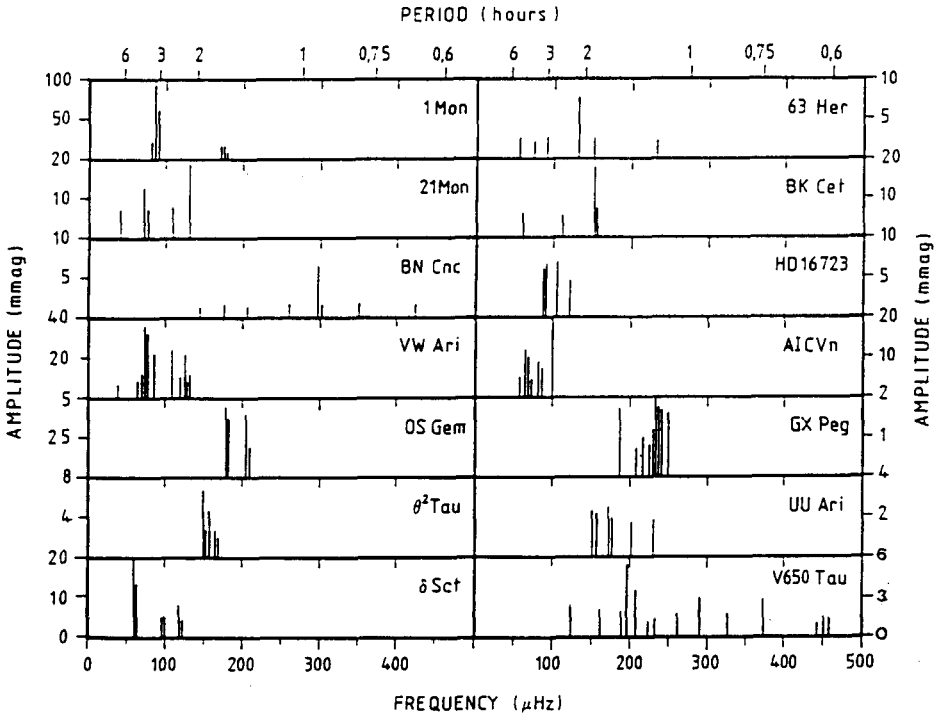


Fig. 1 Up-to-now, δ Scuti star models have had the lack of great simplicity, mainly due to the few observational information available (most stars known were mono or biperiodic). However, this information has improved enormously during the last few years with the organization, not always easy, of longer campaigns and, specially, of world observing networks. This has permitted to obtain large coverages of high quality data of several δ Scuties. The figure shows the amplitude "clean" spectra of most δ Scuties where more than four periods have been discovered so far (see also: Mantegazza et al, 1992). These are the kind of data, theoreticians should start to take into account to improve modelling. This is specially important since stars with apparently similar properties (i.e. same simple modelling) can show extremely different oscillatory behaviour. For more information on each star, you may consult: *Balona et al, 1980* (1 Mon); *Stobie et al, 1977* (21 Mon); *Kovács, 1981* (BN Cnc); *Rucinski, 1978* or *Mc Namara and Horan, 1984* (VW Ari); *Boglia and Conconi, 1985* (OS Gem); *Breger et al, 1987 and 1989* (θ^2 Tau); *Mc Namara et al, 1989* (δ Scu); *Belmonte et al, 1991* (63 Her); *Lampens and Rufener, 1990* (BK Cet and HD16723); *Breger, 1990* and *Breger et al, 1990* (AI CVn); *Michel et al, 1992a* (GX Peg); *Ostermann et al, 1991* (UU Ari) and, finally, *Michel et al, 1992b* (v650 Tau).

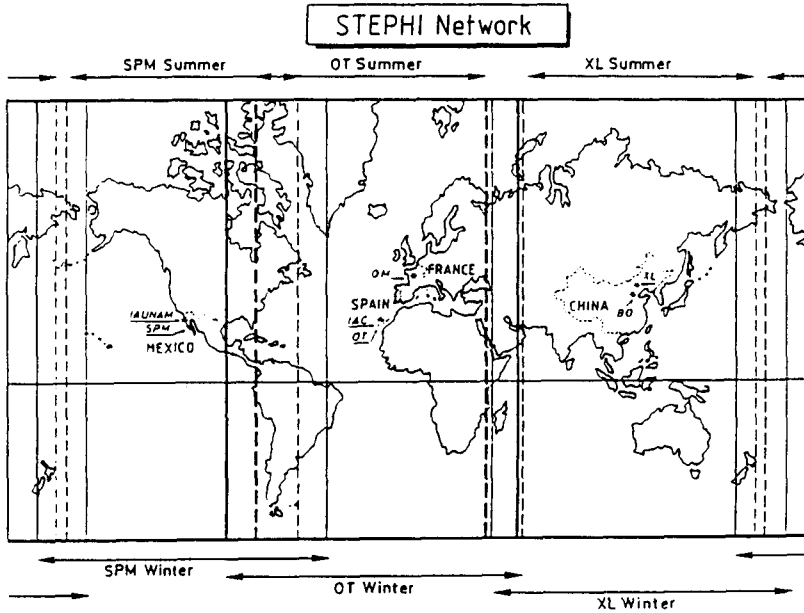


Fig. 2 The STEPHI network. The location of the three observatories: San Pedro Mártir (SPM, Baja California, Mexico), Teide (OT, Izaña, Tenerife, Spain) and Xing-Long (XL, Hopeh, China), allows a theoretical 100% coverage in winter and some 85% in summer. However, due to bad weather conditions and minor technical problems, coverages from 40% to 60% are commonly reached. Meudon provides the network with three identical four-channel Chevreton's photometers (Belmonte et al, 1991).

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