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Abstracts of Presented Papers

Session 2: HAD

2.02 Flamsteed and the Date of Birth of Cassiopeia A
K.W. Kamper (DAO), S. van den Bergh (DAO)

In an earlier study (Ap.J.Suppl. 32, 351, 1976), we found an explosion date of 1657±2 for Cas A based on the proper motions of all fast moving knots. However, a date of 1671 was implied by the fastest moving, and presumably least decelerated, knots outside the main shell. These knots were confined to the NE quadrant which weakened the solution. Our later attempts to refine the solution for all the knots by the explicit inclusion of acceleration terms increased the error of the birth date determination to ±25 years. Recently however, Fesen, Becker, and Blair (Ap.J. 313, 378, 1987) found a number of new faint knots outside the shell in other areas. Two of these, their PMF8 and PMF9 in the NE quadrant, are measureable on archival Hale 5m photographs. In addition, we have found another distant, fast moving knot at the extreme eastern end of the structure. Incorporating the proper motions of these features with revised motions for the NW features provides a stronger minimally decelerated birth date of, once again 1671, however with an error, now, of ±3 years. This new solution does not exclude the possibility that Flamsteed observed the explosion in 1680 since the outlying knots have probably still experienced some slowing. Unfortunately Flamsteed’s observation is not unimpeachable since it rests on a single night’s measures and leaves a large position error of 12’ (cf. Ashworth, J.Hist.Astr. 11, 1, 1980 or Kamper, Observatory 100, 3, 1980). We have searched a microfilm copy of the journals of his extant observations and have found no other observations of this star, 3 Cas. We also note, from this search, that no magnitudes were recorded in the journal for the stars observed that night and different magnitudes are given for 3 Cas in different MSS of the catalogue.

Session 5: Corona, Flares and Solar Wind

5.09 Deriving Solar Wind Speed from Solar Magnetic Field Measurements
A.G. Nash (ARC), Y.-M. Wang, and N.R. Sheeley, Jr. (NRL)

A method has been found to derive solar wind speed at Earth from magnetic observations of the Sun. The method is based on an empirical relationship between the speed of the wind at Earth and the divergence of magnetic flux tubes as they expand outward through the Sun’s corona. Coupled with a mechanism for the transport of magnetic flux on the Sun’s surface, this method provides a capability of predicting solar wind speed and its accompanying geomagnetic and auroral effects several months in advance. Also, this procedure has recently been extended to high latitudes and used to estimate the wind conditions that the NASA/ESA spacecraft, Ulysses, may encounter on its forthcoming journey out of the ecliptic. As Ulysses travels away from the ecliptic during 1992-1994, it may encounter even faster wind at mid-latitudes than at its destination over the Sun’s poles.

Session 6: Solar Interior and Atmosphere

6.09 High Frequency Peaks in the Solar Oscillation Spectrum and the Determination of the Acoustic Source Depth
Edward Lu, Pawan Kumar (HAO/NCAR)

Peaks in the solar acoustic oscillation spectrum above the maximum trapped frequency (5.3 mHz) are shown to be due to the interference of traveling waves, in contrast with the discrete p-mode frequencies below 5.3 mHz. Unlike the p-mode eigenfrequencies, the high frequency interference peaks are sensitive to the position and extent of the source of acoustic oscillations. This property is exploited to determine the depth of the peak of the acoustic source (acoustic emission by turbulent convection). The source strength profile is found to be narrower than ~200 km, and is peaked about 200 km deeper than predicted by mixing length theory. With improved observations and modelling, this technique is likely to open up a direct observational way of learning about the upper part of the solar convection zone.

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Session 7: Stars I

7.18 Lithium-Rich Chromospherically Active Giants
F.C. Fekel (Vanderbilt U.) and S. Balachandran (U. Hawaii)

In recent years, contrary to theoretical expectations, a small number of giant stars have been found to be...