ABSTRACTS

CCD PHOTOMETRY OF THE MAIN SEQUENCE OF NGC 362
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B and V photometry of the globular cluster NGC 362, obtained with the CTIO 4-m PFCCD, shows a well-defined main sequence from the turnoff, near V = 18.5 and (B - V) = 0.45, to V ~ 22. The main-sequence intrinsic width is less than ± 0.010 mag in (B - V), limiting the spread in metal abundance among unevolved main-sequence stars to \( \Delta [\text{Fe/H]} \leq \pm 0.09 \) dex. For our three 3' x 5' fields, centered approximately 7' from the cluster center, there are no blue-straggler candidates, and the distribution of stellar colors about the main sequence indicates there to be at most a small fraction of binary systems on the main sequence. The best match to the isochrones of Vandenberg and Bell (1985, Ap. J. Suppl., 58, 561) is for the case \([\text{Fe/H}] = -1.0\), a helium mass fraction, \(Y\), between 0.26 and 0.30, and an age of ~ 14 Gyr. The data can be matched to slightly more metal poor or rich isochrones by making small adjustments to the accepted values for distance modulus and reddening, or considering smaller values for the mixing length parameter. For these cases, the indicated helium abundance remains relatively high, and the age ranges from 14 – 17 Gyr.

THE SUPERNova FRAGMENTATION MODEL OF SOLAR SYSTEM FORMATION*

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I have further developed my model of solar-system formation. In this model, each fragment of an ejected supernova shell evolves into a separate solar system. Specifically, I have formulated the reverse-flow hypothesis that may have been responsible for the inner, earthlike planets. Using a computer program, I have calculated mass distributions within solar nebulae. I have found mass distributions similar to our solar system over a wide range of model parameters.

MARKARIAN 490: A HIGH-IONIZATION STARBURST GALAXY

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Long-slit spectra and narrow- and broad-band images of the galaxy Mrk 490 are presented. Three components of this object may be recognized; A, the nucleus of the galaxy; B, probably a luminous H II region complex close to A; and C, either a more distant H II region, or the nucleus of a smaller galaxy physically related to A. All have high-ionization emission-line spectra indicating photoionization by early-type stars. Component C has high ionization and large H\(\beta\) equivalent width, indicating a population unusually rich in very hot stars.

LUNAR AND SATELLITE RANGING FROM HALEAKALA, MAUI*

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The Lunar Ranging Experiment (LURE) Observatory on Haleakala, Maui, Hawaii, is operated by the University of Hawaii in support of NASA's Crustal Dynamics Project. The Observatory uses a 200 psec pulsed width, 100 mJ per pulse laser firing five times per second through a 40-cm refractor to illuminate retroreflectors on several artificial satellites and on the surface of the Moon. The return pulses are received by the same telescope in the case of satellite ranging, and by a unique 80-lens light collector for lunar ranging. Time-of-flight measurements are recorded in bins of 100 psec width. The data rate for lunar ranging has been as high as 20 photons detected per minute, and a precision of 1.7 cm has been obtained. The results are important in the study of mass distribution in the Earth and Moon, solid body tides, plate tectonics, and variations in the rotation rates of the Earth and Moon.

A PHOTOMETRIC STUDY OF TWO OB ASSOCIATIONS IN THE MAGELLANIC CLOUDS

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*Poster paper.