HFG1: A PLANETARY NEBULA WITH A CLOSE-BINARY NUCLEUS

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ABSTRACT. HFG1 (136+5°1) is a large, low-surface-brightness planetary nebula that was discovered by Heckathorn, Fesen, and Gull (*Astron. Astrophys.*, 114, 414, 1982). In the autumn of 1986, photoelectric photometry by A.D.G. and H.E.B. showed that the 14th-mag central star of HFG1 is a large-amplitude variable. Subsequent CCD photometry by R.C. and H.E.B. reveals a sinusoidal variation with a period of 13.96 hr and an amplitude of 1.1 mag in the B band.

We interpret the nucleus of HFG1 as a close binary and attribute its light variations to heating of one hemisphere of a main-sequence companion by an extremely hot primary; no true eclipses occur. Spectroscopic observations of the central star obtained by T.F. show high-excitation emission lines whose strengths are highly variable and in phase with the orbital period. The phase dependence of the emission lines indicates that they arise in the heated hemisphere of the cool companion star.

HFG1 is the newest example of a planetary nebula whose nucleus is an extremely close binary. The nebulae have probably been ejected through binary-star interactions, possibly during a "common-envelope" phase.

S. Torres-Peimbert (ed.), Planetary Nebulae, 310.
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