

Near Infrared High Angular Resolution Observations of Stars and Circumstellar Regions by Lunar Occultations

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The high angular resolution technique of lunar occultations enables one dimensional source structure in the direction of occultation to be extracted from the observed fringe pattern after detailed analysis taking into account the frequency response of the detection system, the optical filter bandwidth and the telescope size. A program of observing lunar occultations in the near infrared from 1.2m telescope at Gurushikhar, Mt Abu, India (72°47'E, 24°39'N, 1680m), is currently being pursued. Several occultations have been successfully observed in K band (2.2 μ m) including a day time event. The instrument used was a InSb based infrared high speed photometer, the details of which are given in a earlier paper (Ashok N.M., Chandrasekhar T. and Sam Ragland, 1994, *Experimental Astronomy*, 4, 177).

Table 1 lists the angular size values in milliarcsecond (mas) derived from the occultation measurements. In some cases the values represent upper limits only.

TABLE 1: Results from occultation light curves

Sl. No.	Source	Date	Angular Diameter (mas)		Remarks
			measured	¹ From $F_v V_s [V-K]_o$	
1	IRC 10013	26 Dec 90	² 4.2±0.5	3.0	Possibly extended Large Polarisation in R - Circumstellar Shell?
2	IRC 30094	22 Feb 91	² 3.0±0.5	2.5	
3	IRC 20190	22 Feb 91	2.6±0.5	2.1	3.1mas in K (Ridgway, 1982) <2mas in V (Beavers, 1978) 1.8mas in K (Ridgway, 1982)
4	IRC 20200	25 Mar 91	3.3±0.3	3.4	
5	IRC 00198	17 Mar 92	² 2.9±0.3	1.8	
6	IRC 20169	4 Feb 93	² 1.8±0.3	2.2	

¹Modified Barnes-Evans relation

²Most likely an upperlimit

Comparison of angular size derived from our analysis with those from a modified Barnes-Evans relationship yields a reasonable level of agreement within errors. Extension of the occultation program to longer wavelengths and fainter stars at the 1.2m Gurushikhar telescope are in progress.

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