The Astrophysical Journal, 644:475–483, 2006 June 10

FIRST RESULTS FROM THE CHARA ARRAY. IV. THE INTERFEROMETRIC RADII OF LOW-MASS STARS

D. H. Berger[1]
CHARA Array, Mount Wilson Observatory, Mount Wilson, CA 91023; berger@chara-array.org

D. R. Gies and H. A. McAlister
Center for High Angular Resolution Astronomy, Georgia State University, P.O. Box 3969, Atlanta, GA 30302-3969;
gies@chara.gsu.edu, hal@chara.gsu.edu

T. A. ten Brummelaar
CHARA Array, Mount Wilson Observatory, Mount Wilson, CA 91023; theo@chara-array.org

T. J. Henry
Center for High Angular Resolution Astronomy, Georgia State University, P.O. Box 3969, Atlanta,
GA 30302-3969; thenry@chara.gsu.edu

J. Sturmann, L. Sturmann, and N. H. Turner
CHARA Array, Mount Wilson Observatory, Mount Wilson, CA 91023;
judit@chara-array.org, sturmann@chara-array.org, nils@chara-array.org

S. T. Ridgway and J. P. Aufdenberg
National Optical Astronomy Observatory, P.O. Box 26732, Tucson, AZ 85726;
ridgway@noao.edu, jasona@noao.edu

and

A. Mérand
LESIA, UMR8109, Observatoire de Paris-Meudon, 5 place Jules Janssen,
92195 Meudon Cedex, France; antoine.merand@obspm.fr
Received 2005 September 30; accepted 2006 February 9

ABSTRACT

We have measured the angular diameters of six M dwarfs with the CHARA Array, a long-baseline optical interferometer located at Mount Wilson Observatory. Spectral types range from M1.0 V to M3.0 V and linear radii from 0.38 to 0.69 $R_{\odot}$. These results are consistent with the seven other M dwarf radii measurements from optical interferometry and with those for 14 stars in eclipsing binary systems. We compare all directly measured M dwarf radii to model predictions and find that current models underestimate the true stellar radii by up to 15%–20%. The differences are small among the metal-poor stars but become significantly larger with increasing metallicity. This suggests that theoretical models for low-mass stars may be missing some opacity source that alters the computed stellar radii.

Subject headings: infrared: stars — instrumentation: high angular resolution — instrumentation: interferometers — stars: individual (GJ 15A, GJ 514, GJ 526, GJ 687, GJ 752A, GJ 880) — stars: late-type

SUBCLASIFICACION DE ESTRELLAS Y SUS COLORES

(Mihalas & Binney 1981)
W.H. Freeman & Co; San Francisco

SECUENCIA PRINCIPAL Subclasificación V (Enanas)

	B-V	U-B	R/R⊙	Teff	M/M⊙
O5	−0.32	−1.15	14	47000	40
O7	−0.32	−1.14		38000	
O9	−0.31	−1.12		34000	
BØ	−0.30	−1.08	7.2	30500	16
B2	−0.24	−0.86		23000	6
B5	−0.16	−0.56	3.8	15000	
B7	−0.12	−0.42		13000	
AØ	−0.06	−0.19		9500	
A5	0.15	0.09		8300	
FØ	0.29	0.04	1.26	7300	1.6
F5	0.42	−0.01		6600	
GØ	0.58	0.05		5900	
G5	0.69	0.20		5600	
KØ	0.85	0.47		5100	
K5	1.16	1.09	0.72	4200	0.6
MØ	1.42	1.25		3700	
M5	1.61	1.22	0.20	3000	0.16

CLASE DE LUMINOSIDAD III (GIGANTES)

	B-V	U-B	T_{eff}
O5	-0,32	-1,15	
O7	-0.32	-1.14	
O9	-0.31	-1.12	
BØ	-0.30	-1.09	
B2	-0.24	-0.88	
B5	-0.16	-0.56	
B8	-0.09	-0.30	
AØ	0.00	0.00	
A5	0.15	0.10	
FØ	0.27	0.10	
F5	0.45	0.07	
GØ	0.65	0.30	5400
G5	0.84	0.52	4800
KØ	1.03	0.87	4400
K5	1.45	1.65	3600
MØ	1.57	1.80	3300
M5	1.80	2.10	2700

SUPERGIGANTES CLASE DE LUMINOSIDAD I

	B-V	U-B	Teff
O5	−0.32		
O7	−0.32		
O9	−0.28		30000
B0	−0.24	−1.05	25500
B2	−0.17	−0.91	
B5	−0.09	−0.72	13500
B8	−0.02	−0.53	
A0	0.01		
A5	0.07		
F0	0.21		6400
F5	0.40		
G0	0.70		5400
G5	1.07		4700
K0	1.37		4000
K5	1.65		3400
M0	1,90		2800
M5	2.10		