

The RMS Survey: The Bolometric Fluxes and Luminosity Distributions of Young Massive Stars

J.C. Mottram[1,2], M.G. Hoare[1], J.S. Urquhart[3], S.L. Lumsden[1], R.D. Oudmaijer[1] T.P. Robitaille[4], T.J.T. Moore[5], B. Davies[6,1], J. Stead[1]

1=School of Physics and Astronomy, University of Leeds, Leeds, LS2 9JT, UK.

2=Department of Physics and Astronomy, University of Exeter, Exeter, Devon, EX4 4QL, UK.

3=Australia Telescope National Facility, CSIRO Astronomy and Space Science, Sydney, NSW 2052, Australia.

4=Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA.

5=Astrophysics Research Institute, Liverpool John Moores University, Twelve Quays House, Egerton Wharf, Birkenhead, CH41 1LD, UK.

6=Rochester Institute of Technology, 54 Lomb Memorial Drive, Rochester, NY 14623, USA.

Context: The Red MSX Source (RMS) survey is returning a large sample of massive young stellar objects (MYSOs) and ultra-compact (UC) Hii regions using follow-up observations of colour-selected candidates from the MSX point source catalogue.

Aims: To obtain the bolometric fluxes and, using kinematic distance information, the luminosities for young RMS sources with far-infrared fluxes.

Methods: We use a model spectral energy distribution (SED) fitter to obtain the bolometric flux for our sources, given flux data from our work and the literature. The inputs to the model fitter were optimised by a series of investigations designed to reveal the effect varying these inputs had on the resulting bolometric flux. Kinematic distances derived from molecular line observations were then used to calculate the luminosity of each source.

Results: Bolometric fluxes are obtained for 1173 young RMS sources, of which 1069 have uniquely constrained kinematic distances and good SED fits. A comparison of the bolometric fluxes obtained using SED fitting with trapezium rule integration and two component greybody fits was also undertaken, and showed that both produce considerable scatter compared to the method used here.

Conclusions: The bolometric flux results allowed us to obtain the luminosity distributions of YSOs and UCHii regions in the RMS sample, which we find to be different. We also find that there are few MYSOs with $L \geq 10^5 L_{\text{sol}}$, despite finding many MYSOs with $10^4 L_{\text{sol}} \leq L < 10^5 L_{\text{sol}}$.

Reference: A&A

Status: Manuscript has been accepted

Weblink: <http://adsabs.harvard.edu/abs/2010arXiv1009.1774M>

Comments:

Email: joe@astro.ex.ac.uk