Abstract

Prominent star forming regions have been investigated at wavelengths between 1.2 μm and 1300 μm, covering a large mass spectrum of the observed young stellar objects. Their evolutionary stages were determined by established classification procedures and turned out to range from collapsing cloud fragments, Class 0 protostars to more evolved Class I sources. The creation of spectral energy distributions allowed to derive physical properties like temperatures, luminosities, masses and densities by fitting modified Planck functions to the measured flux distributions. For source extents that exceed the expected size of a pointsource, their dimensions have been obtained by two-dimensional Gaussian fits. In cases, where measurements from different epochs exist, a possible temporal evolution has been discussed.

The study of low-mass objects has been carried out in dark molecular clouds, widely spread throughout the galactic plane, where Herbig–Haro objects are a signpost of star formation activity. 7 of 17 observed sources are Class 0 protostars, with HH 108 MMS being one of the youngest stellar objects discovered so far. 5 additional objects appear to be in a transitional stage between Class 0 and Class I. A surprising result of this study was the detection of Herbig–Haro objects at (sub)millimetre wavelengths which could originate from warm dust, compressed by the associated molecular outflows or jets.

The bright emission nebula M 17 (Omega nebula, NGC 6618) has been chosen as a template for high-mass star formation, where the investigations were concentrated on the adjacent molecular cloud M 17 SW. In order to examine the warm extended dust, mid-infrared maps, created from 133 single images at 10.5 μm and 20.0 μm covering ~17′ have been produced. An eye-catching dust ridge of 4′5 length and a colour temperature of 230 K has been found which most probably consists of dense dust, swept up by an advancing ionization front. The mosaic shows 22 compact sources which have been investigated in more detail; 4 are new detections. All sources satisfy the Class I criterion; 4 of them lie close to the Class II borderline. The observed objects comprise a binary of massive young stars, one of those being a quickly evolving ultra-compact H II region, massive Class I sources surrounded by dust cocoons and circumstellar disks, and probably the first detection of a protostellar spiral.