P117a Dissecting the dust composition in the circumstellar environment of a young close binary system SVS13

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It is generally thought that planet formation begins with micron-sized dust grains, which are dragged by gas in the hot gaseous protoplanetary nebula, and when they collide they stick with one another and grow in size. They continue to grow by collision until they become $\gtrsim 1$ km entities called planetesimals, at which stage gravity takes over and finally 'runaway' growth of a few bodies leads to planet formation. It is therefore of great interest to study the mineralogy of circumstellar dust around young stars as it represents the original constituents of planetesimals and hence of the rocky planets like our own Earth. To this end, we have obtained perhaps the most unique N-band (8−13 μm) spectrum ever observed towards the low-mass, embedded pre-main-sequence close binary system SVS13. Complex absorption features are clearly detected and we identify dust components in the circumstellar environment by fitting various emissivities and absorption coefficients, and by utilising mid-infrared spectro-polarimetry results. We also speculate on the physical origin of the respective dust species and why they are all simultaneously present towards SVS13.