Colloquium

SFB 956

Conditions and Impact of Star Formation

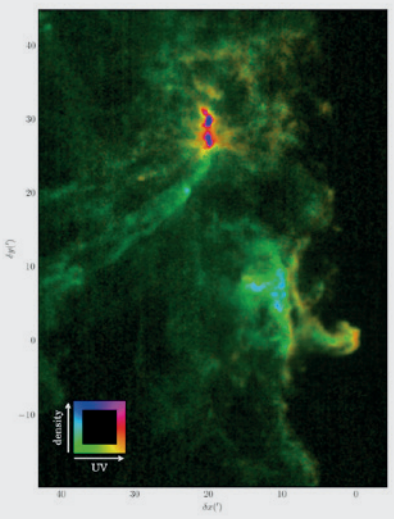
14 January 2019

Monday 3:00 pm

Max-Planck-Institut für Radioastronomie

Auditorium 0.02

Auf dem Hügel 69 | 53121 Bonn



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Characterising the Physical Properties of the ISM from Molecular Emission

New receivers and spectrometers installed at millimeter and submillimeter telescopes now have very large bandwidths spanning tens of gigahertz at very high resolutions (~50-200kHz) yielding spectra comprising of hundred of thousands channels. These observing modes are now standard, which means that spectral surveys are now the observations obtained by default. With these instruments, large, several square degree, maps of the ISM are starting to be observed yielding massive hyperspectral datasets combining the emission of tens of species. The observed line intensities are function of both the ISM chemical composition and physical condition; using these molecular datasets it is possible to extract these ISM properties. In the framework of the ORIONB IRAM 30m large program we have developed statistical methods to study the physical conditions of the ISM solely from the observed molecular emission.

I will present in particular:
i) the application of a Principal Component Analysis to decompose the maps into regions of low/high density and low/high UV illumination (Gratier et al. 2017),

ii) the application of the MeanShift clustering algorithm to segment the molecular cloud into physically and chemically similar regions (Bron et al. 2018) and,

iii) preliminary results on the application of supervised machine learning to infer the total column density from molecular emission.