Hα kinematics of NGC 6357 and NGC 6334

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Context: The star forming regions NGC6334 and NGC6357 are amid the most active star-forming complexes of our Galaxy where massive star formation is occuring. Both regions gather several HII regions but they exhibit different aspects: NGC6334 is characterised by a dense molecular ridge where recent massive star formation is obvious while NGC6357 is dominated by the action of the stellar cluster Pismis 24 which have shaped a large cavity. To better understand the global properties of these regions and to study the impact of the individual HII regions to the global star formation of each complex we analysed high spectral resolution Hα observations led with a scanning Fabry-Perot interferometer. Such data allows us to study the kinematics of the ionised gas. We present here the first results of this study which concern the nature of the optical HII regions belonging to NGC 6334 and NGC 6357.

The data: Data cubes (x, y, λ) have been obtained (in 1994) with a 36cm telescope (located at ESO - La Silla Observatory) equipped with a scanning Fabry-Perot interferometer and a photon counting camera (spatial resolution: 9” × 9”, field of view: 38’ × 38’). The spectral sampling is 5 km s^{-1} for a spectral range of 115 km s^{-1} (typical velocity accuracy of 1 kms^{-1}, le Coarer et al. 1992). We extracted and decomposed (automatic process) the profiles (**Fig. 1**) through a regular grid (45” × 45” cells). In addition to the night-sky lines (geocoronal Hα and OH) we impose to fit the profiles with 3 nebular (gaussian) components.
We produced velocity field, FWHM maps (**Fig. 2 and 3**) and in **Fig. 4 and 5** the velocity dispersion versus intensity plots (σ-I plots).

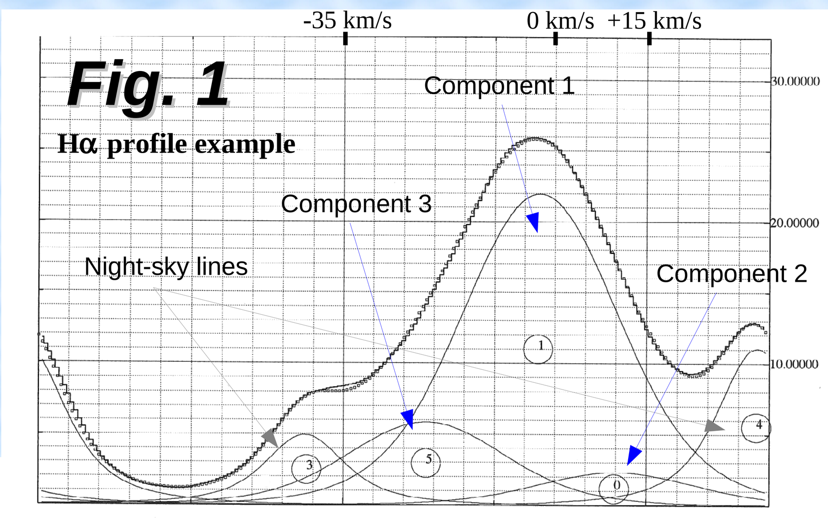

Fig. 1 Hα profile example

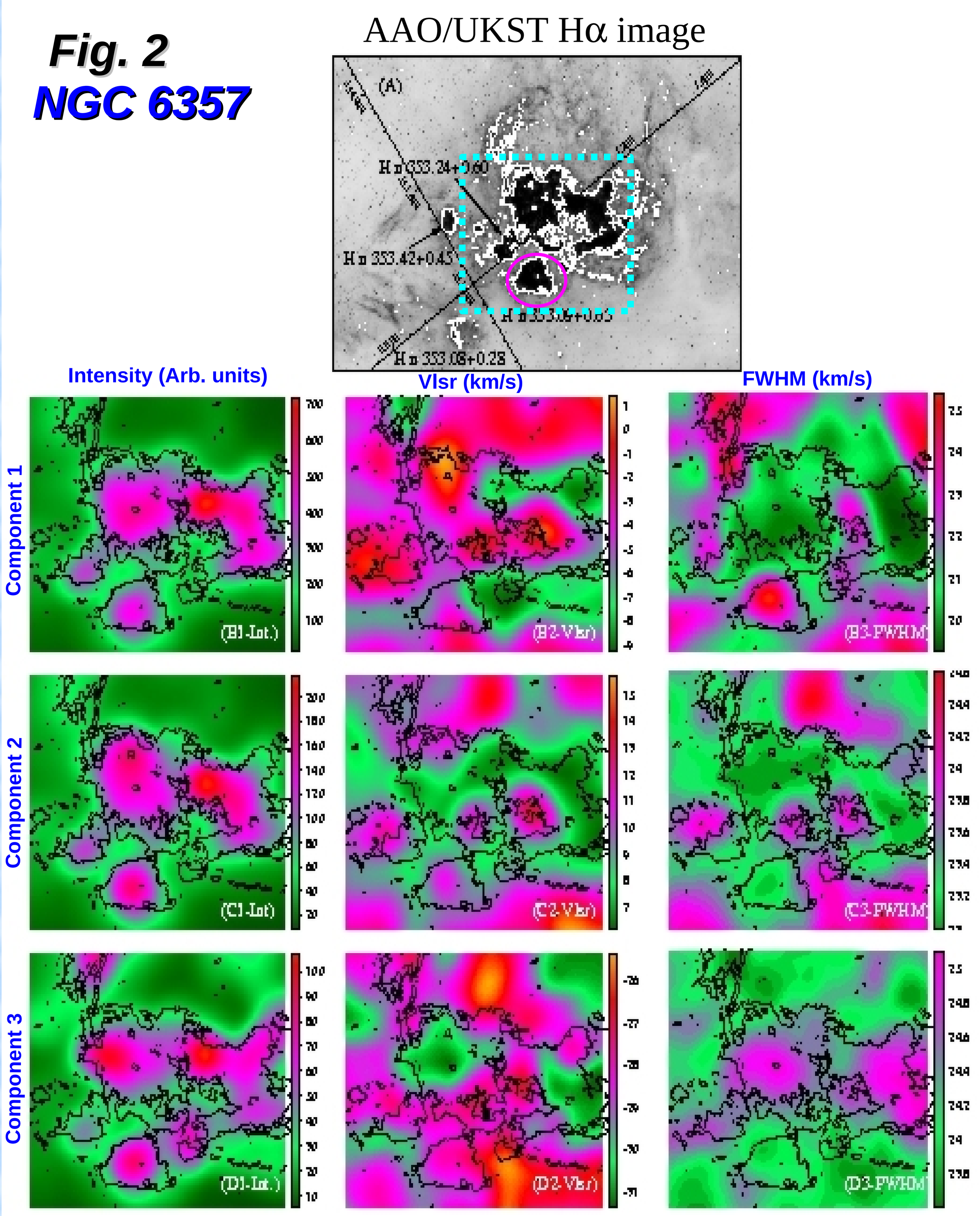

Fig. 2 NGC 6357

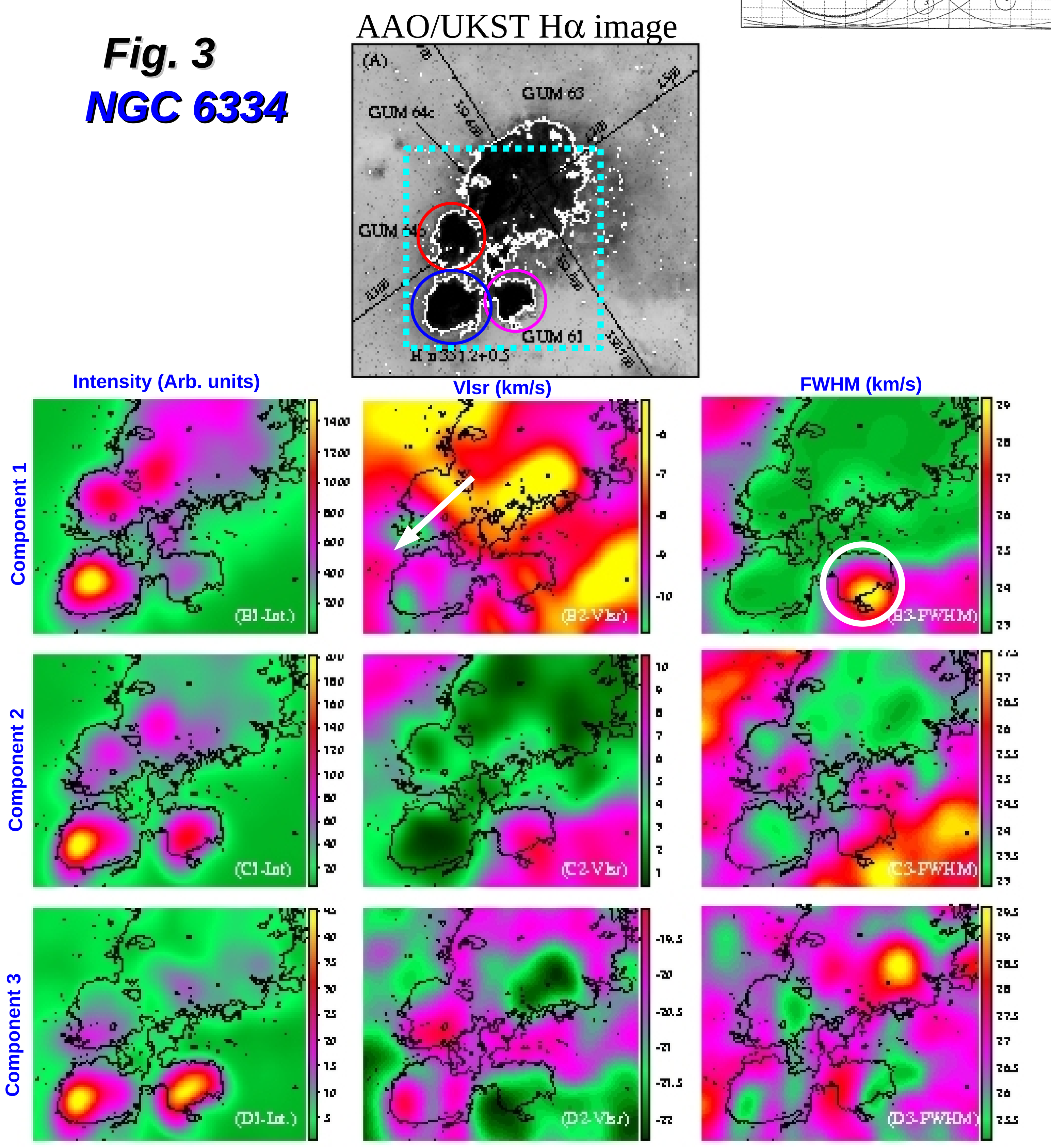

Fig. 3 NGC 6334

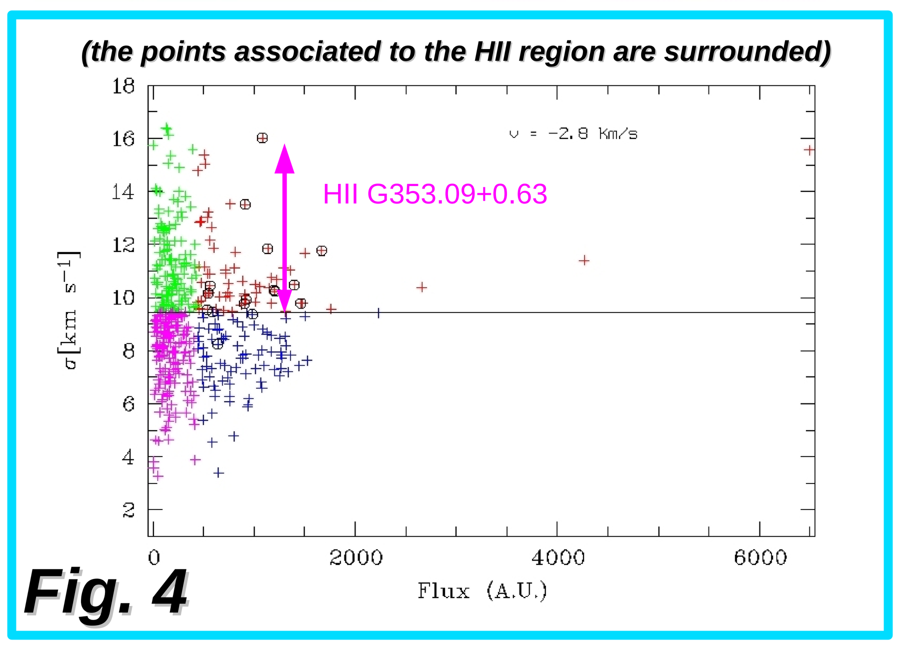

Fig. 4

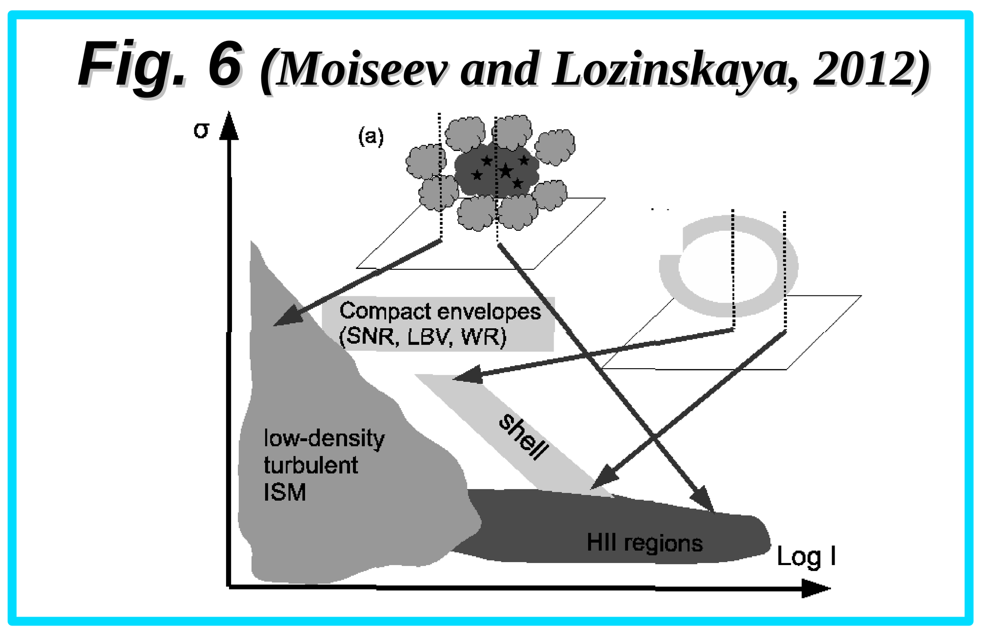

Fig. 6 (Moiseev and Lozinskaya, 2012)

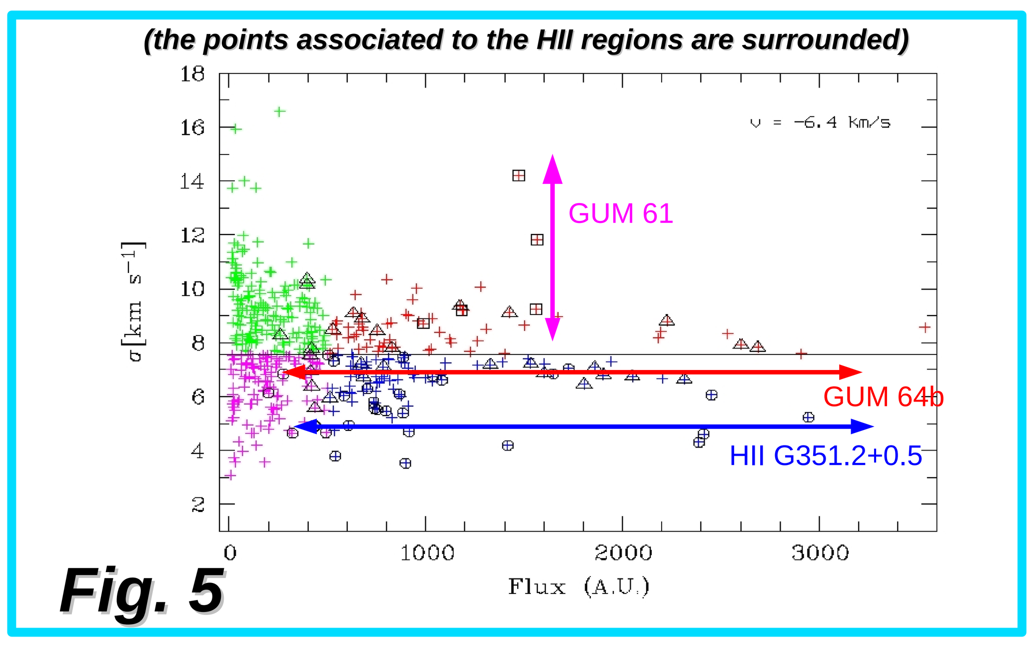

Fig. 5

Analyse and Results: The kinematic analysis (**Fig. 2 and Fig. 3**) allows us to estimate the expansion velocity of the regions (**Table 1**) and shows us that GUM64b exhibits a clear velocity gradient (white arrow) suggesting it is in the "Champagne phase" expansion. GUM 61 exhibits a clear FWHM gradient from its border to its centre (white circle) suggesting it is a shell-like HII region probably shaped by stellar wind.
Moiseev and Lozinskaya (2012) show (**Fig. 6**), for extra-galactic regions, that the morphology of the ionised gas regions can be revealed by different features in σ-I plots. Such features are observed (**Fig. 4 and Fig. 5**), for the fisrt time, for galactic HII regions and allow us to confirm the shell morphology for GUM61 (**Fig. 5**) and suggest similar morphology for the region G353.09+0.63 (**Fig. 4**) excited by the stellar cluster AH03J1725-34.4. Inversely GUM64b and G351.2+0.5 appear as typical HII regions.

Perspectives: The next step is to compare these results with the structure and properties of the molecular clouds/filaments, as seen by Herschel, and molecular surveys (e.g. SEDIGISM, MALT90 ...). We plan to look at the distribution of the massive dense cores, as catalogued in the frame of the Herschel-HOBYS program, respectively to these optical HII regions in order to better understand their impact to the interstellar medium and the star-formation efficiency.

Table 1

Region Name	Expansion Velocity
GUM 61	15 km/s
GUM 64b	> 6 km/s
G353.09+0.63	18 km/s
G351.2+0.5	5 km/s

References:

Le Coarer, E., Amram, P., Boulesteix, J. et al. 1992, 1&A 257, 389
Moiseev, A., Lozinskaya, T., 2012, MNRAS 423, 1831

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