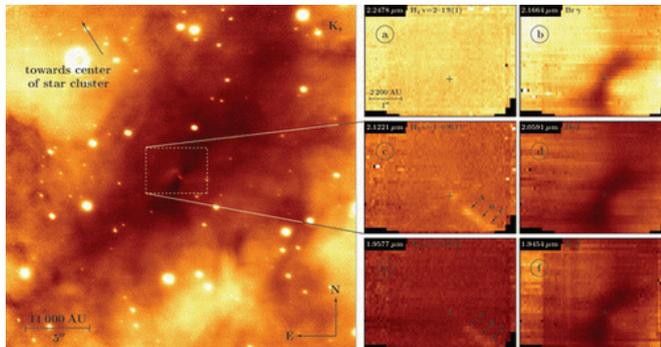


A jet of molecular hydrogen arising from a forming high-mass star

7 March 2007



Left: Near-infrared image of the M17 silhouette disk, discovered in 2004. The field of view is 27"x27", which roughly corresponds to 60000 AU x 60000 AU (AU stands for astronomical units). Right: Zoom on the central region at six selected wavelengths. The pictures were obtained with SINFONI. Each panel has a field of view of 4.8"x3.6" (i.e. 10560 AU x 7920 AU). While panels (b), (d), and (f) show the densest inner part of the silhouette disk, panels (c) and (e) reveal the H₂ jet (individual emission knots are labelled with A, B, and C).

A team of European astronomers offer new evidence that high-mass stars could form in a similar way to low-mass stars, that is, from accretion of gas and dust through a disk surrounding the forming star. Their article, published in *Astronomy & Astrophysics*, reports the discovery of a jet of molecular hydrogen arising from a forming high-mass star located in the Omega nebula (M17). This detection confirms the hypothesis based on their earlier discovery that this forming high-mass star is surrounded by a large accretion disk.

While astronomers now understand the overall process of low-mass star formation very well, the formation process of massive stars is still very much under debate. Recent astronomical observations suggest that high-mass stars could form through accretion processes, just like low-

mass stars do. For instance, in 2004, European astronomers discovered a large accretion disk that probably surrounds a forming high-mass star, in the star-forming region M17, also known as the Omega nebula and located at a distance of about 7000 light years.

Looking again at M17 with the new spectrograph SINFONI at the ESO-VLT, the same European group report discovering a jet of molecular hydrogen (H₂) that apparently arises from the forming high-mass star. The picture below illustrates this discovery, which is being published in *Astronomy & Astrophysics*.

The ejection of material through a jet or an outflow is always linked to accretion of gas and dust, either onto the circumstellar disk or onto the central protostar. The detection of the H₂ jet thus provides evidence that ongoing accretion processes occur in the M17 disk. The team also estimates the mass outflow and mass accretion rates, which suggest that a star of high mass is forming within the M17 disk. This is an additional clue that high-mass stars form in a similar way to lower mass stars.

Source: *Journal Astronomy & Astrophysics*

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