Jets from a young star, Herbig-Haro 24
The dramatic awakening of an infant star

In this Hubble Space Telescope image, an infant star awakens by blasting twin jets of material into space as a sort of birth announcement to the universe.

The developing star resides in a turbulent birthing ground for new stars known as the Orion B molecular cloud complex, located 1,350 light-years away, in our Milky Way galaxy. The star and its jets are called Herbig-Haro 24 (HH 24).

The star cannot be seen in the image because it is surrounded by dust. This material is left over from the gravitational collapse of the giant gas cloud that formed the star. Hubble observed HH 24 in near-infrared light, which penetrates some of the material cocooning the newly forming star and captures a view of the jets. Planets may later form in a disk of gas and dust encircling the star. However, at this early stage, gas from the disk is raining down onto the star. Some of the superheated material is shot outward from the star. The material is confined to two narrow jets of material. The jets travel in opposite directions along uncluttered escape routes — the directions perpendicular to the disk. The HH 24 jets are the long, thin columns of gas that slice through the center of the image.

These energetic jets are blasting across space at more than 100,000 miles per hour. Each jet collides with dense gas and dust along its path, clearing vast spaces, like a stream of water plowing into a hill of sand. The collision produces shock fronts, which heat the surrounding gas to thousands of degrees Fahrenheit. Tangled, knotted clumps of gas are formed at the shock fronts.

Image Credit: NASA and ESA, the Hubble Heritage (STScI/AURA)/Hubble-Europe (ESA) Collaboration, D. Padgett (GSFC), T. Megeath (University of Toledo), and B. Reipurth (University of Hawaii)

VOCABULARY

Shock front: A high-pressure wave moving at supersonic speeds. When a jet of gas from a young star plows into dense material, a shock front is created.

Herbig-Haro objects: Small, bright nebulae that form when narrow jets of gas ejected by newly born stars plow through clouds of gas and dust.

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