Imaging a multiple star

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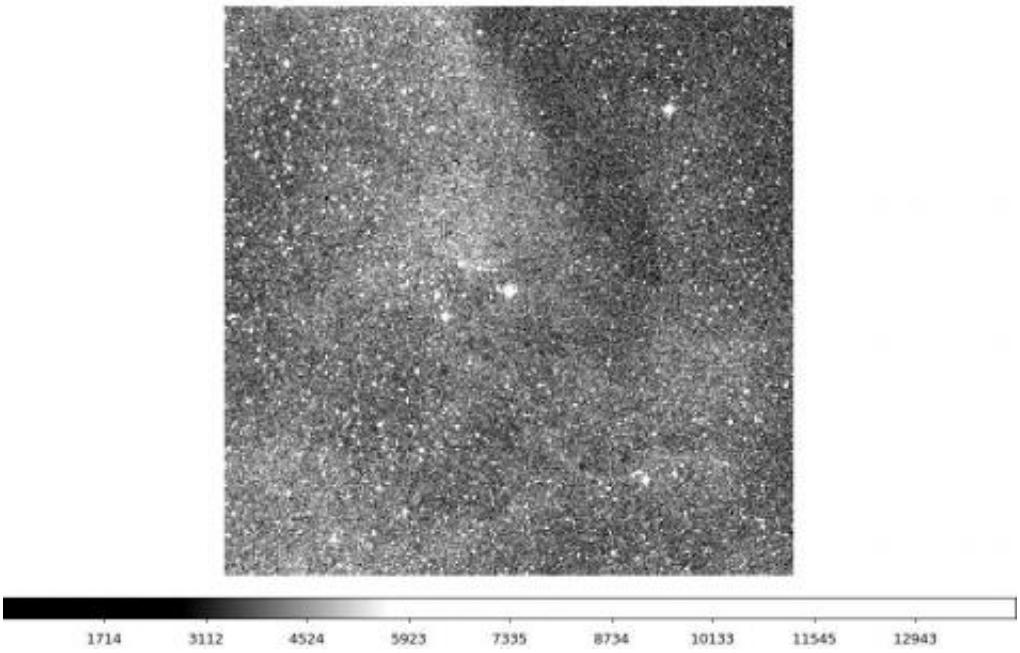

An optical image of the field of stars with the triple system GW Orionis at the center. Astronomers have succeeded in obtaining the first very high resolution images of this system in which two stars orbit at a separation of 1.4 AU and the third is at a distance of 8 AU.

(PhysOrg.com) -- Multiple stars - binaries, triplets, or perhaps more stars, that orbit each other - are unique laboratories into the interactions between stars and their early environments.

Young stars develop by accreting matter. How and when the accretion stops, and hence what determines a star's final mass, is among the

important unsolved puzzles in astronomy. In a multiple star system the accretion is even more complex because it potentially involves material around each star in addition to material around the group. A better understanding of multiple stars, especially those that orbit each other closely and hence affect the accretion more strongly, can shed light on the accretion process.

CfA astronomers Nat Carleton and Marc Lacasse, together with a team of eighteen others, used the Smithsonian's Infrared Optical Telescope Array (IOTA, now retired from operation) on Mt. Hopkins, AZ, to make the first direct optical image of a triple stellar system with an orbit as small as one astronomical unit (one AU is the average distance of the Earth from the sun).

The astronomers were able to measure reliably the parameters of the triple system, called GW Orionis. One star has a mass of 3.6 solar-masses, and it orbits with a 3.1 solar-mass star at a distance of 1.35 AU. A third companion star, previously inferred to exist from studies of the stellar wobble, is also imaged, and orbits the others at a distance of about 8 AU. The system is unusually bright in the near-infrared, suggesting that some accretion onto the system is still continuing, but further work is needed to sort out the answer to this question. The results highlight the power of optical telescope arrays in the investigation of close multiple stars.

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