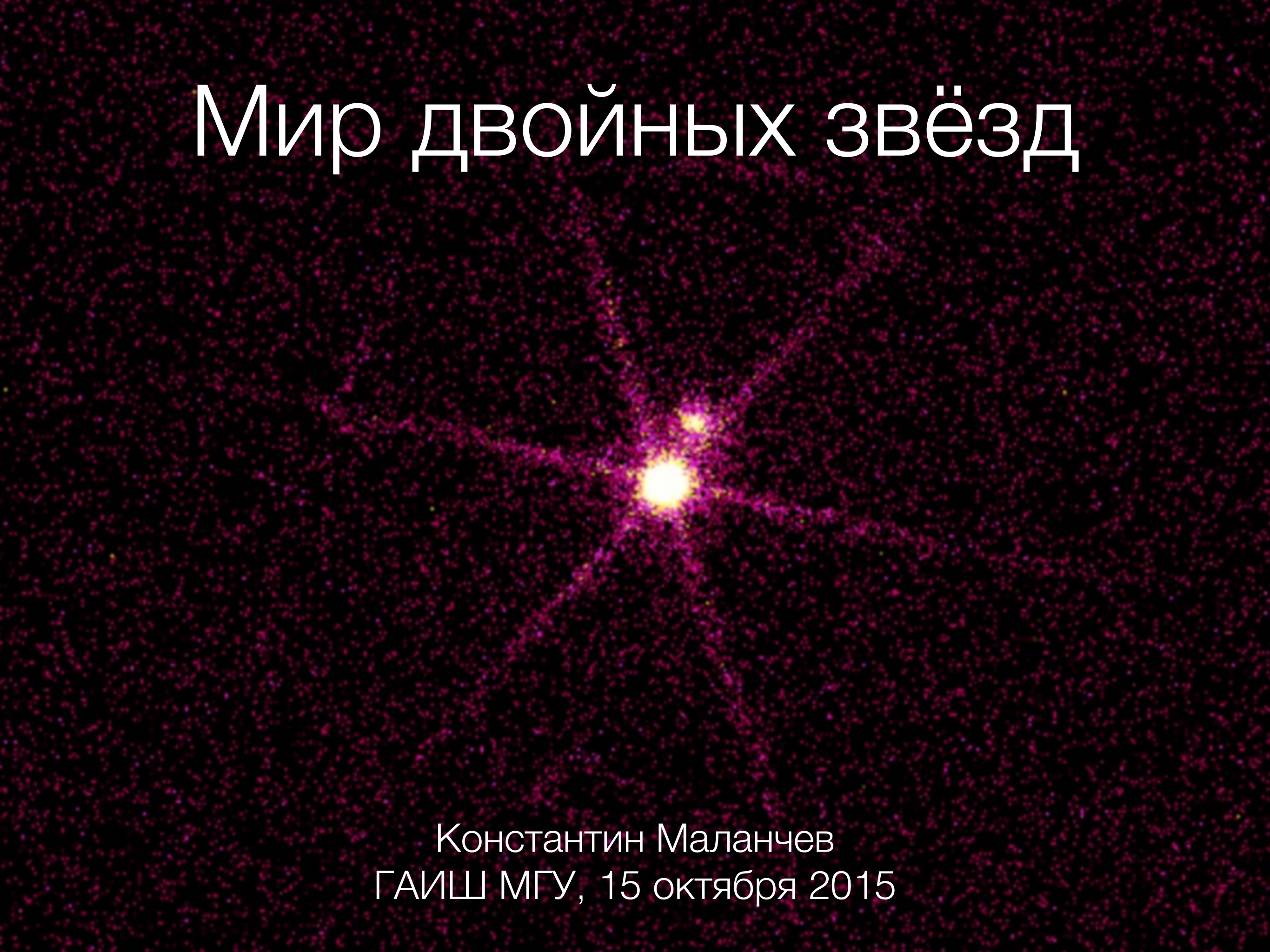


Мир двойных звёзд

The background of the slide is a deep-field astronomical image. It shows a vast number of stars of various colors (white, yellow, red) scattered across a black space. In the center of the image, there is a particularly bright and dense region where two stars are very close together, appearing as a single point of light with a complex, multi-lobed structure, likely representing a binary star system or a star-forming region. This central feature is the focal point of the slide's title.

Константин Маланчев
ГАИШ МГУ, 15 октября 2015

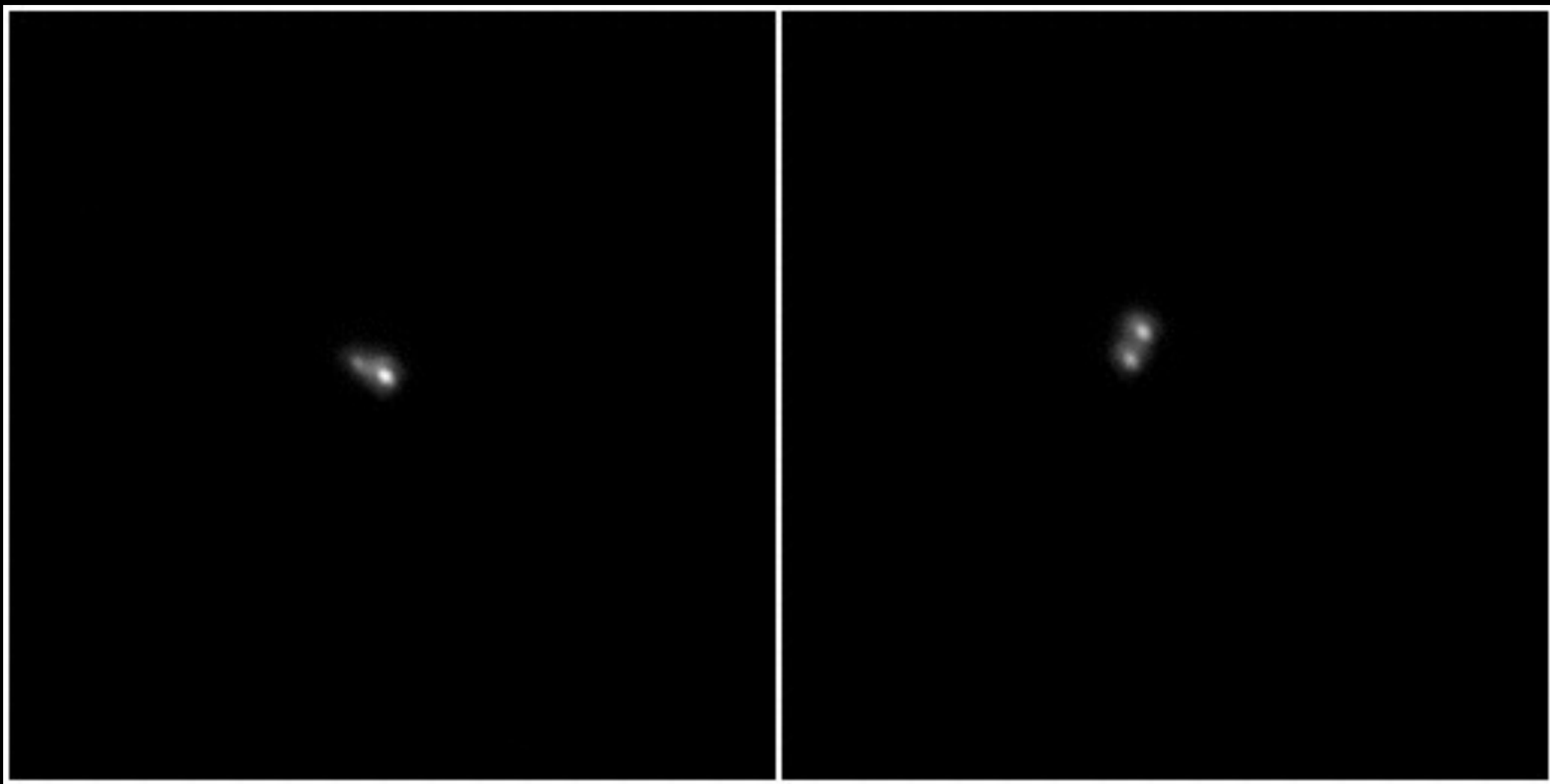


Фото: Сергей Лисаков



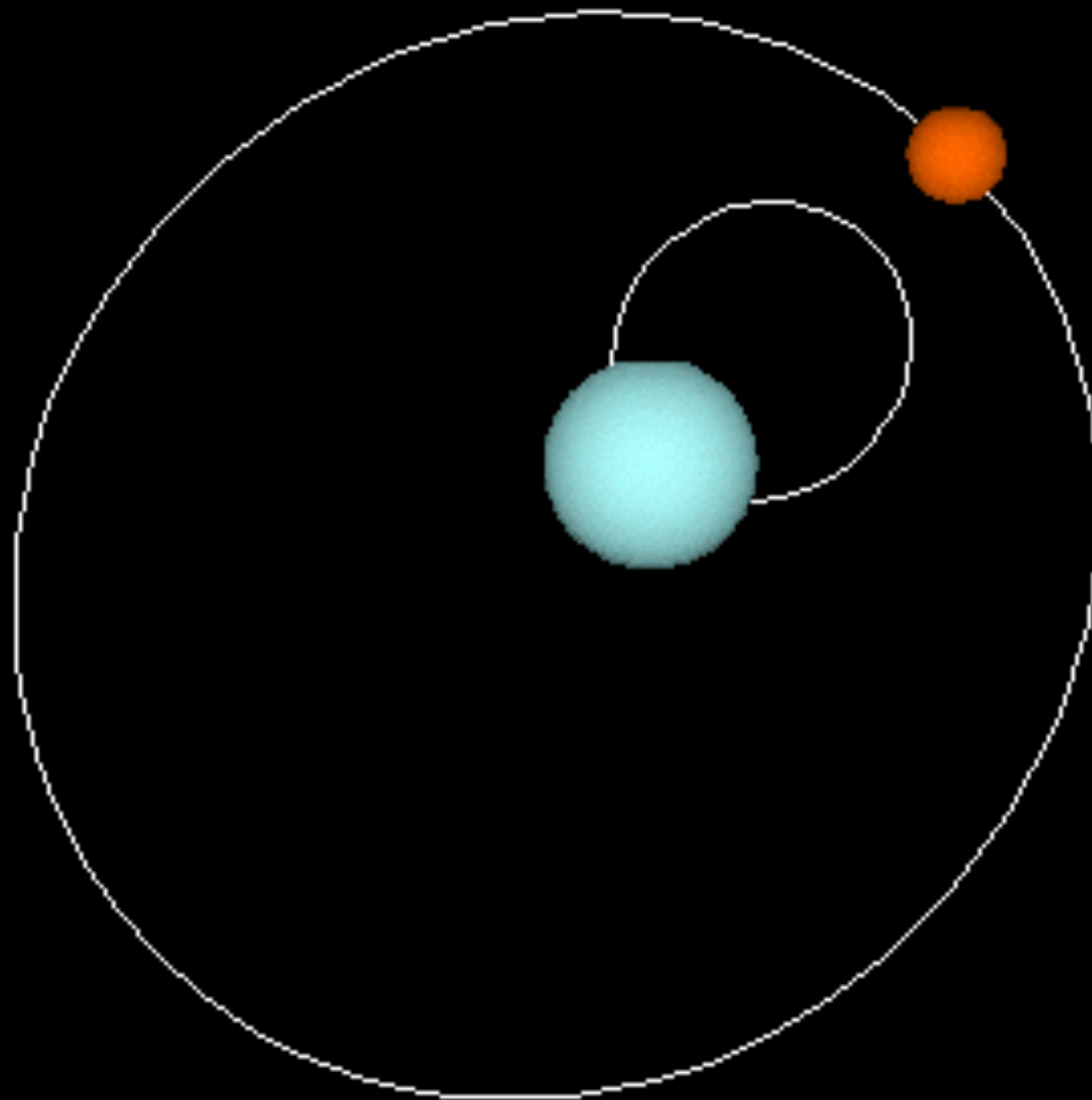
Эпсилон Лир

Фото: Сергей Голышев



Эпсилон Лирьы

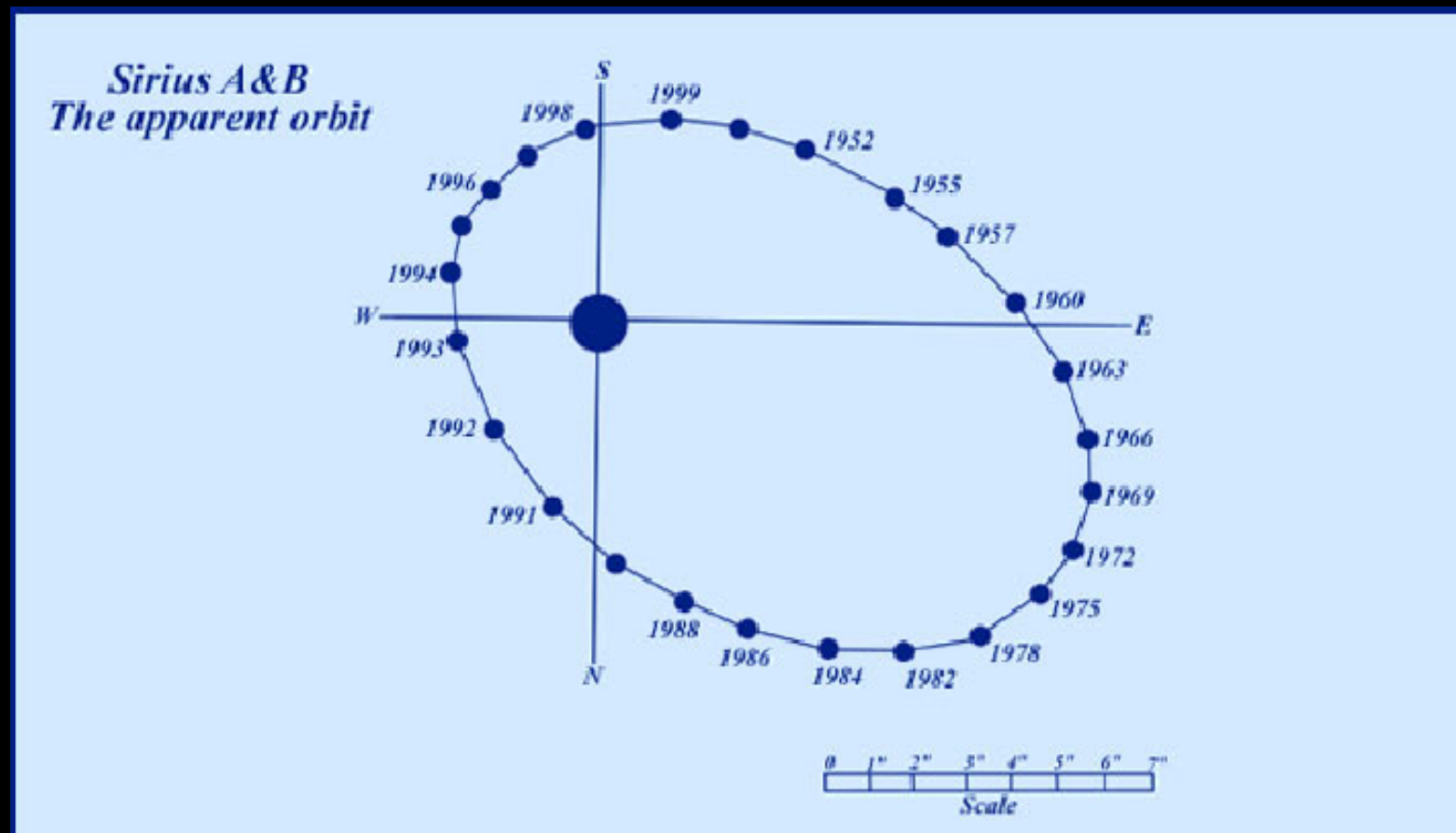
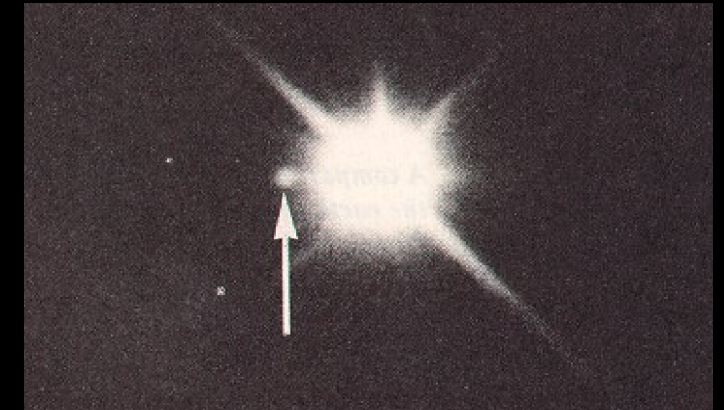
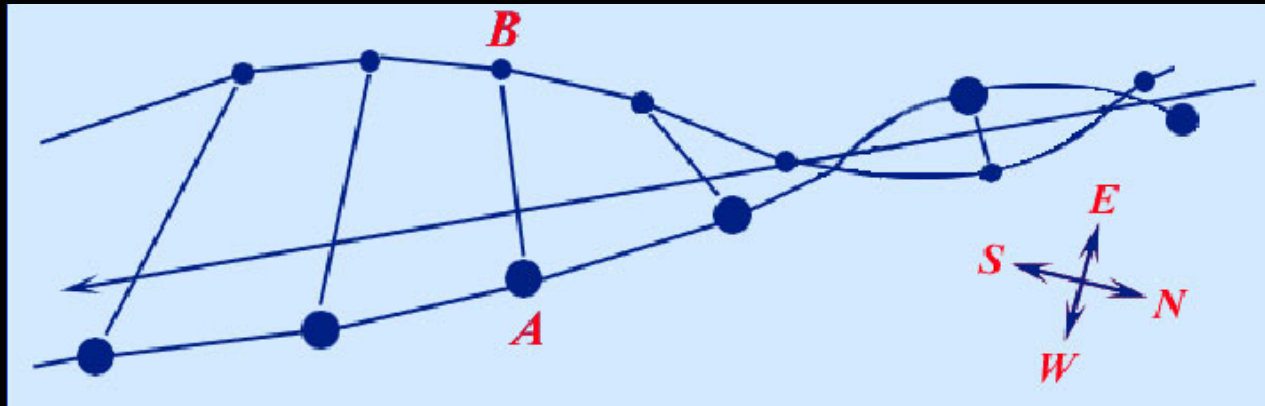
Фото: Сергей Голышев



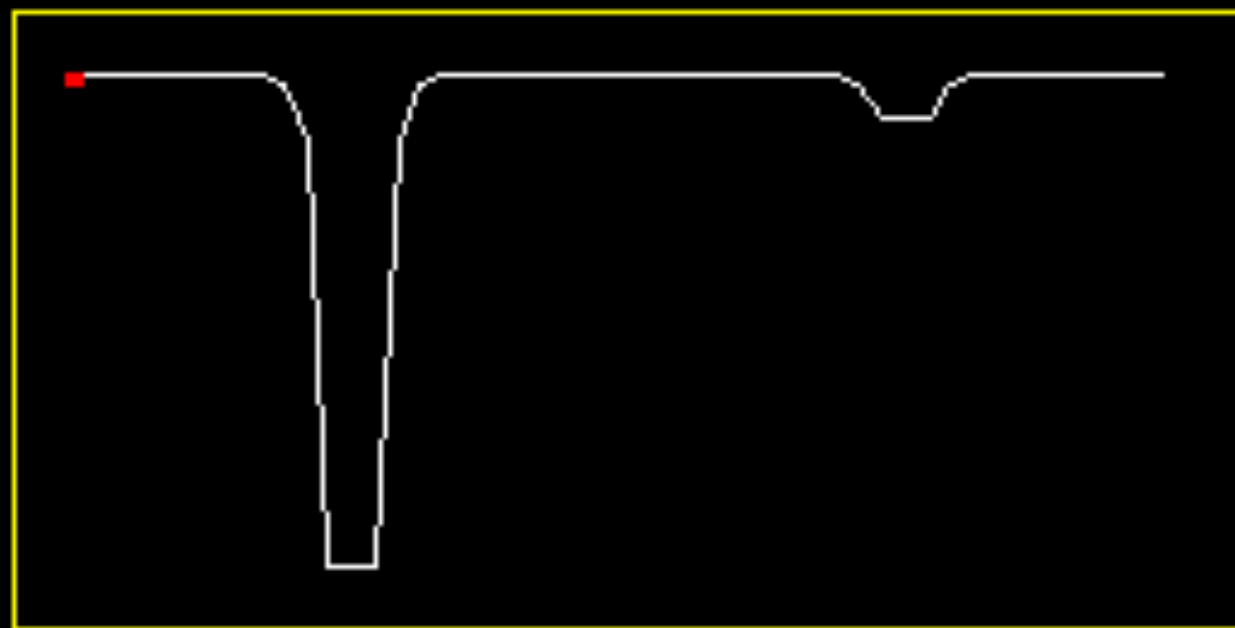
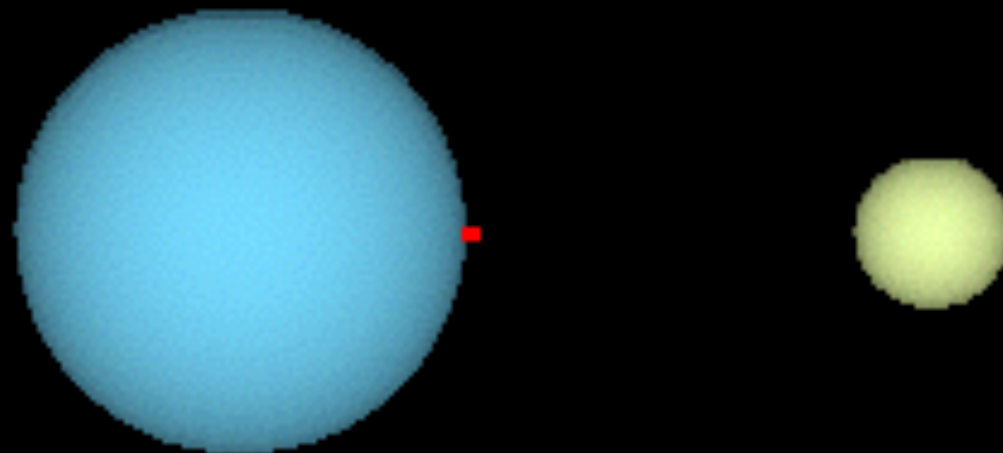
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Визуально-двойная звезда

Анимация: P. Rogge

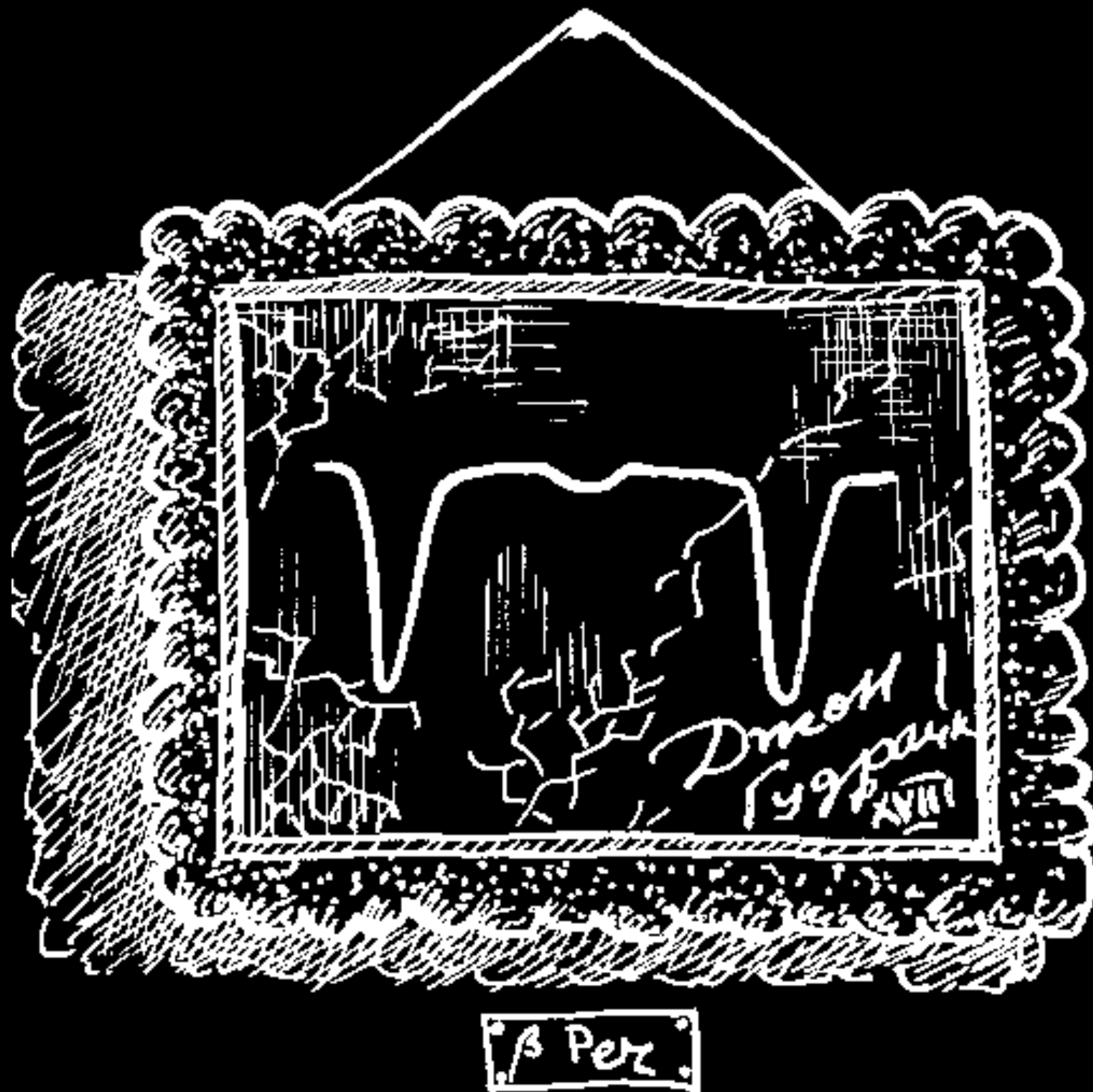


Сириус Б



Затменная двойная звезда

Анимация: P. Rogge

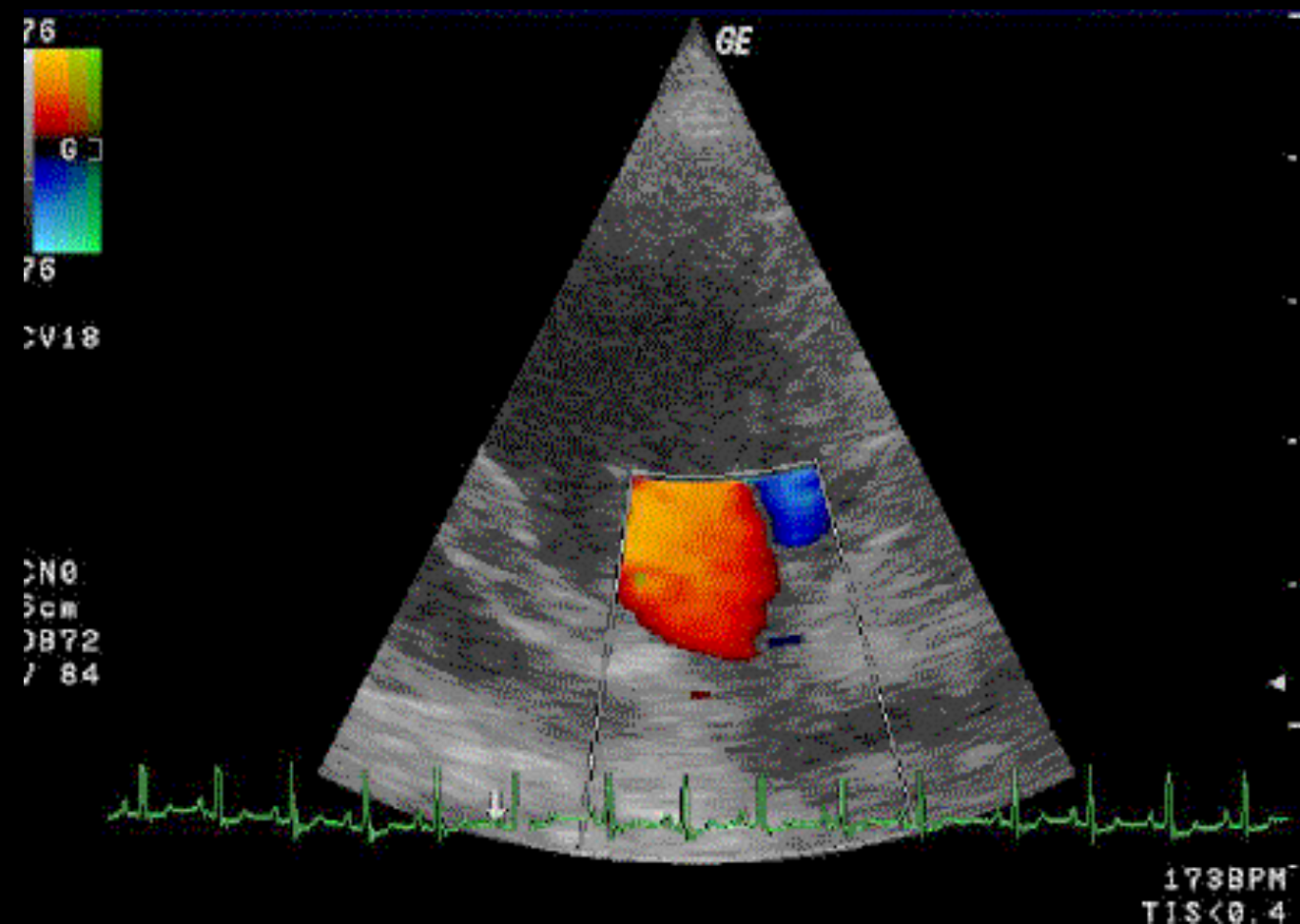


АЛГОЛЬ

Изображение: В. Липунов



Фото: Glan Wallace

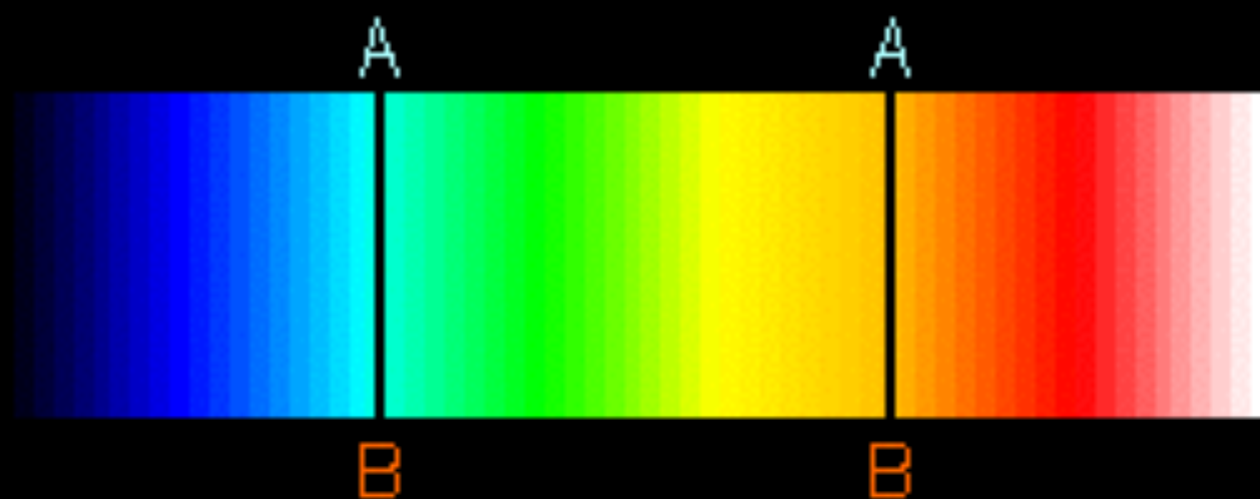
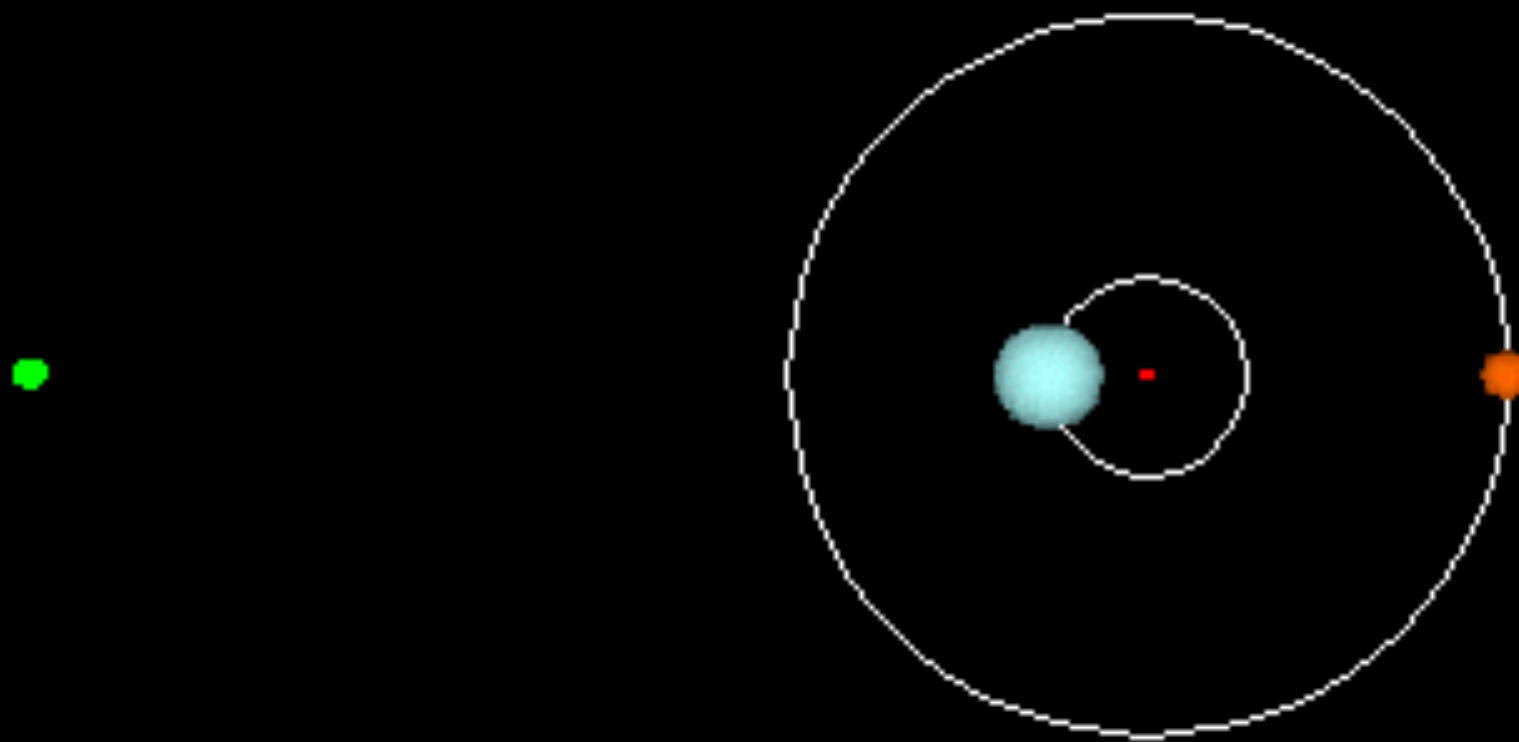


Анимация: Kolumet, Wikipedia Commons



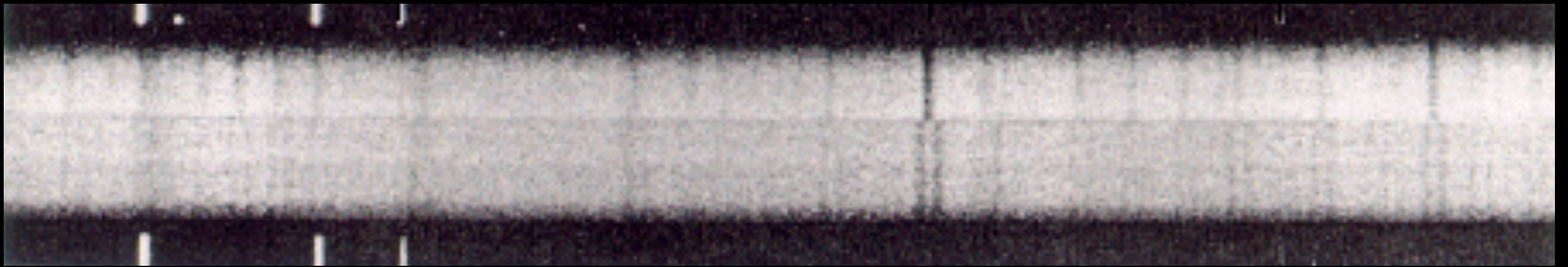
Изображение: TxAlien, Wikipedia Commons

Эффект Допплера

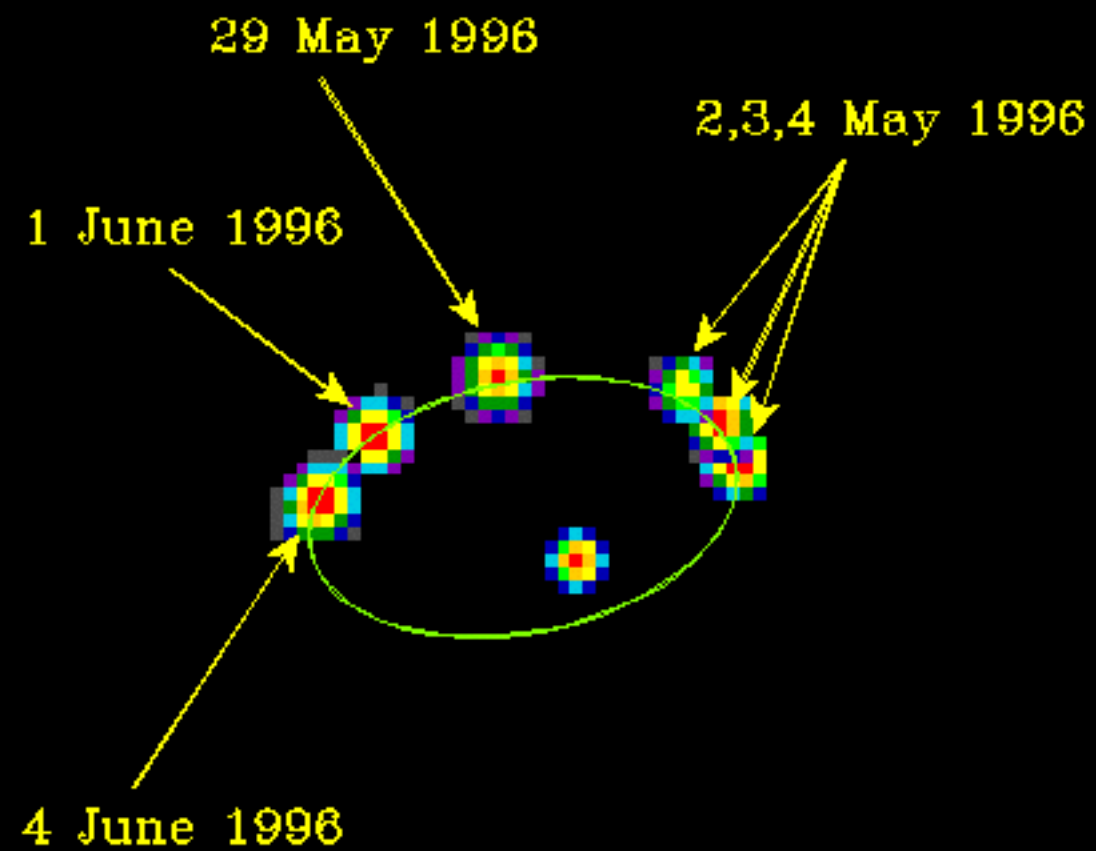


Спектрально-двойная звезда

Анимация: P. Rogge

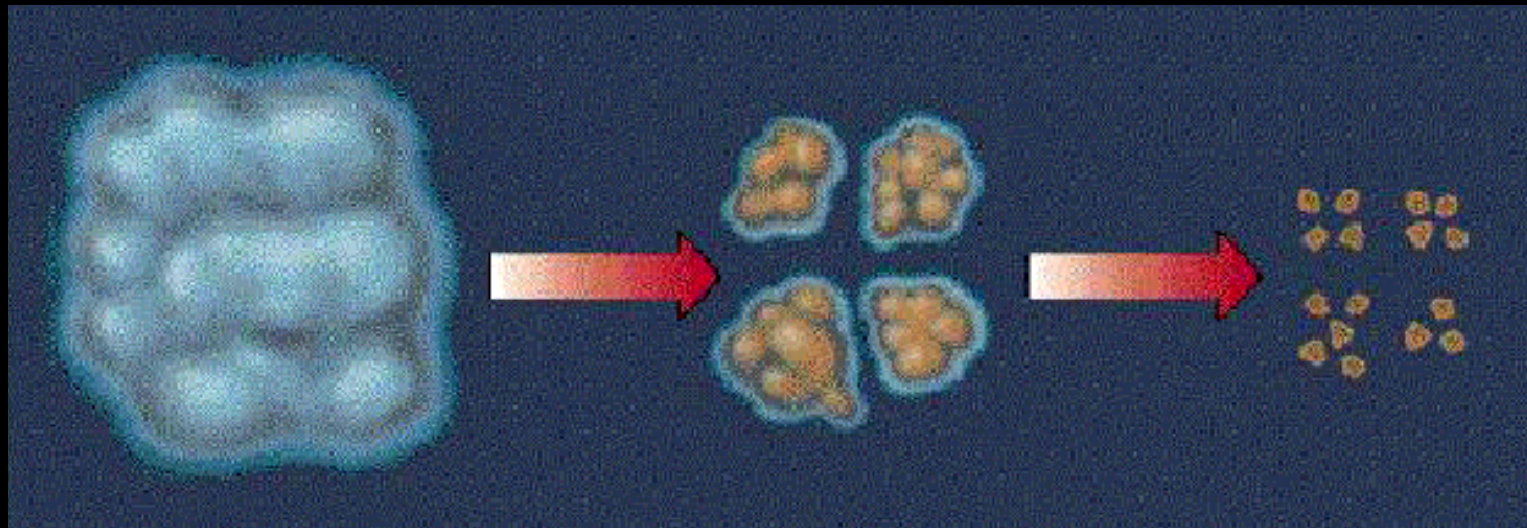


Изображение: Caltech

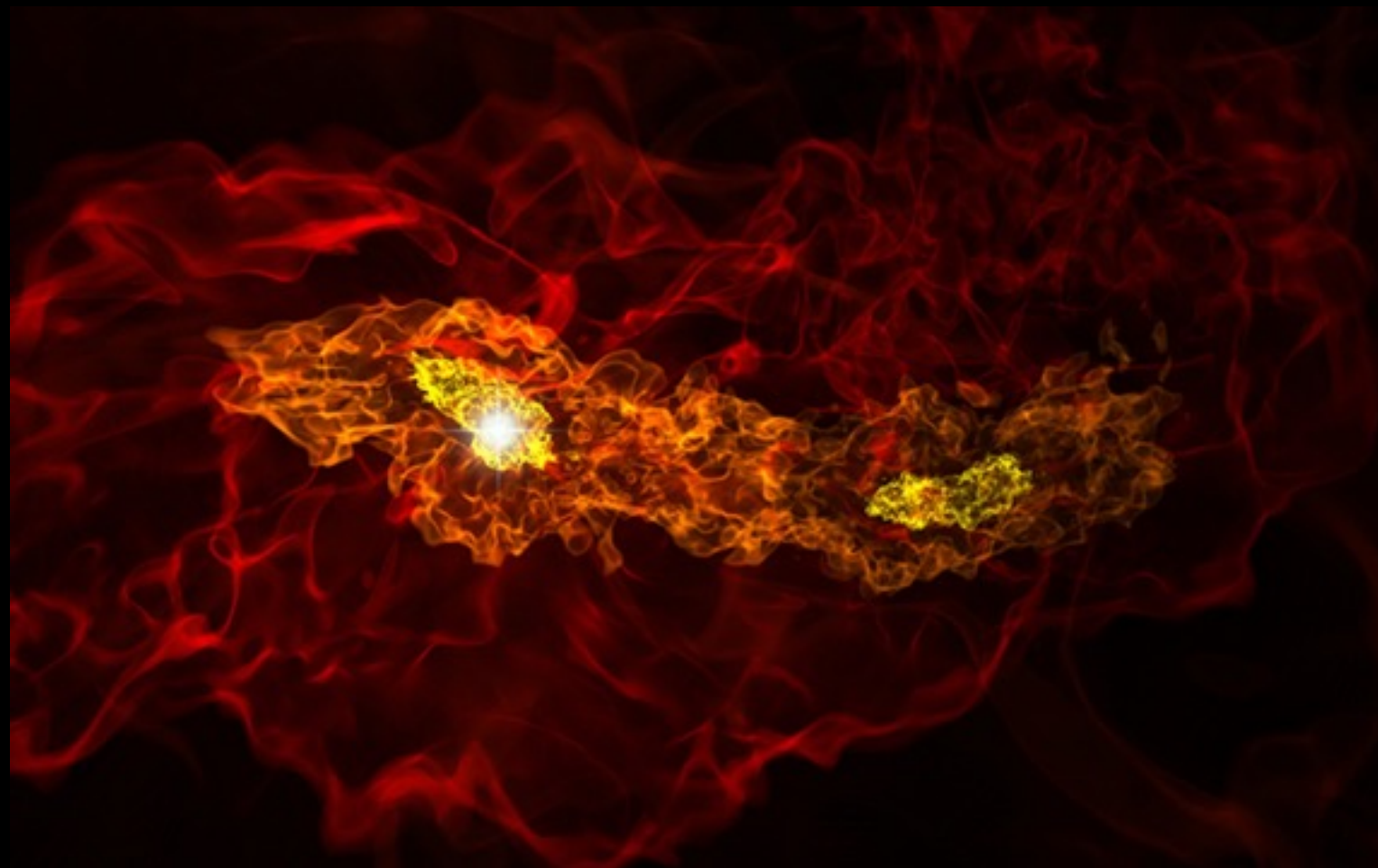


Изображение: R. Nemiroff, J. Bonnel

Мицар А

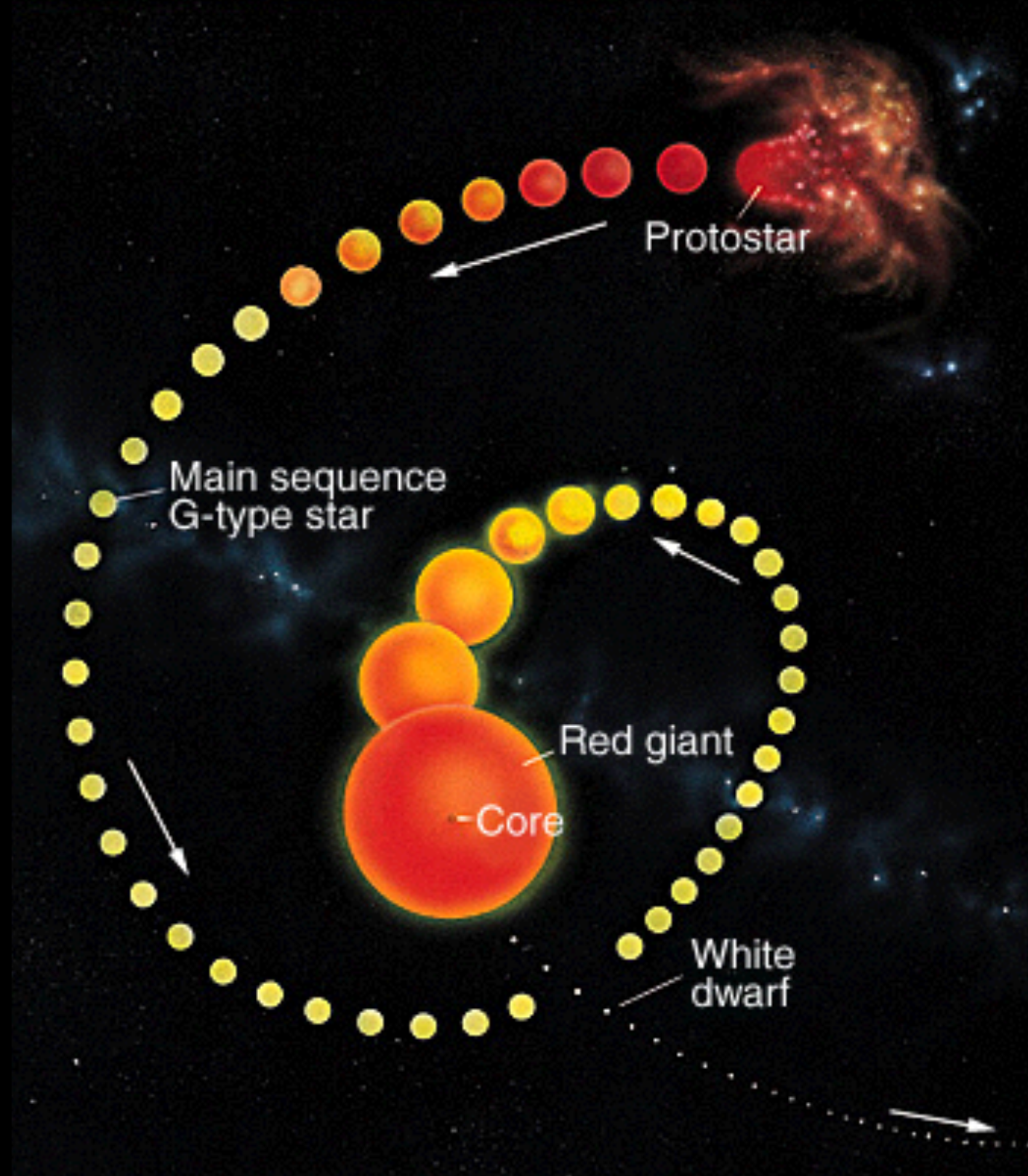


Изображение: «Astronomy Today 2E», Prentice Hall



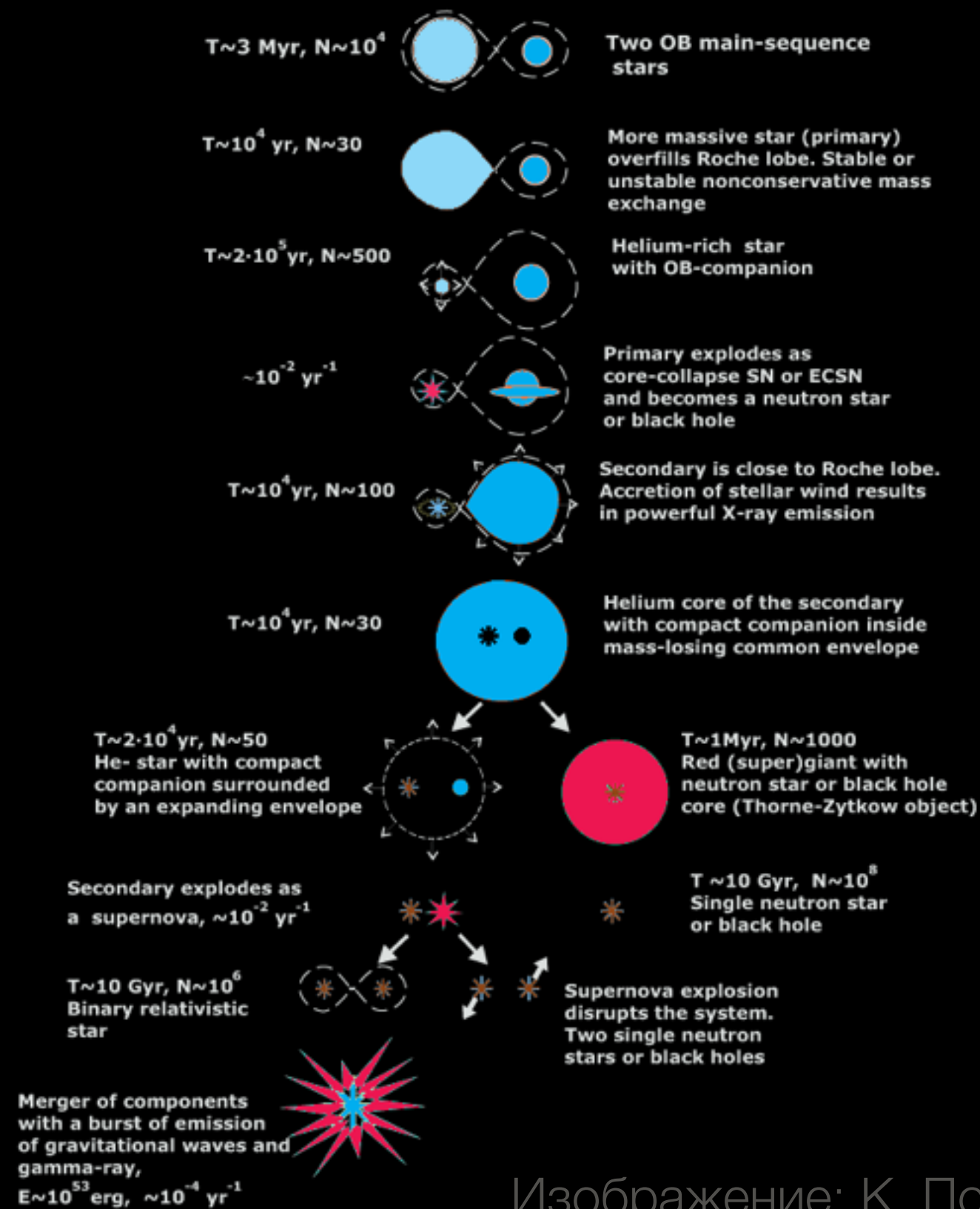
Изображение: M. Turk, T. Abel, B. O'Shea

Формирование двойных звёзд



Изображение: «Astronomy Today 2E», Prentice Hall

Эволюция Солнца



Изображение: К. Постнов, Л. Юнгельсон

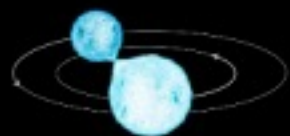
Эволюция тесной двойной системы



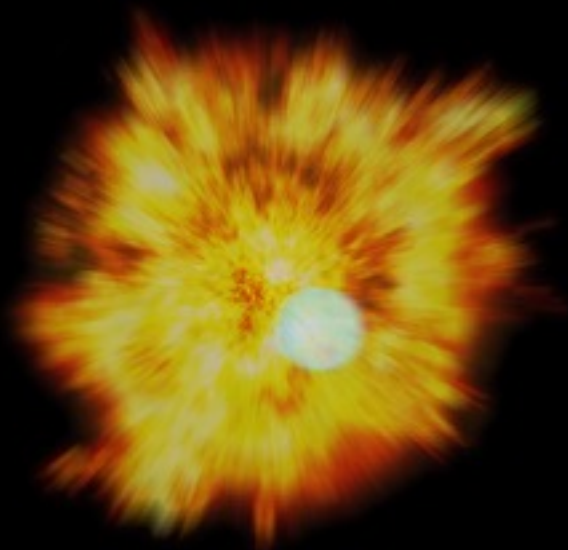
Изображение: NASA's Marshall Space Flight Center

Циркуль X-1

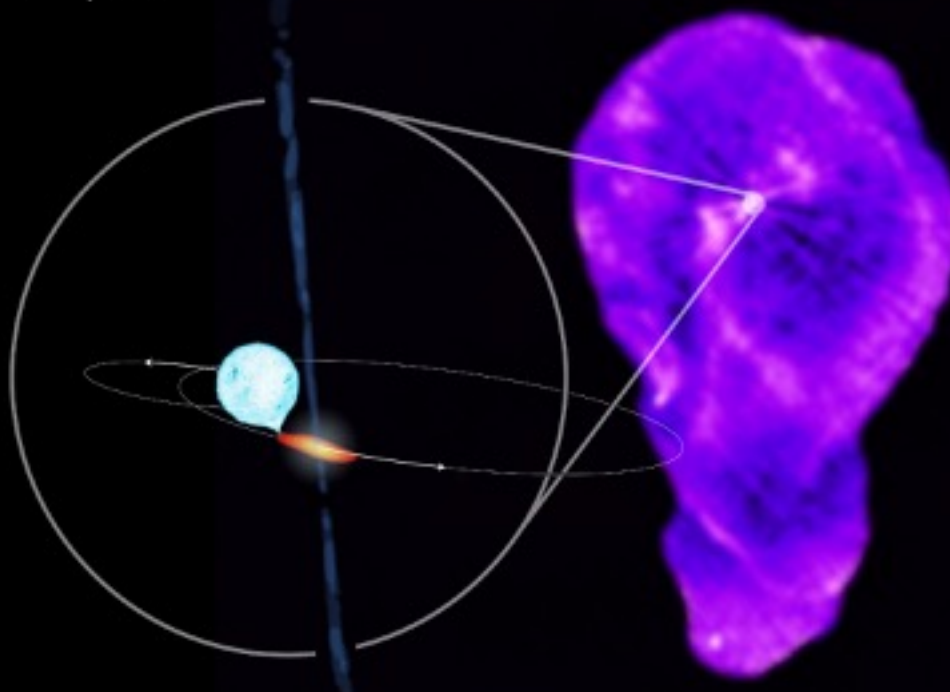
1) Two ordinary stars orbit each other for a few million years after they were born.



2) The initially more massive star runs out of nuclear fuel and explodes in a supernova, leaving behind a neutron star.



3) The neutron star and its companion in **Circinus X-1** orbit each other inside the short-lived residual glow of the supernova explosion. The explosion distorted the orbit to become elliptical. At closest approach, the neutron star is force-fed by its companion.



4) We observe **Circinus X-1** approximately 2,500 years after the explosion. Typical X-ray binaries are observed millions to billions of years after the supernova. Their supernova remnants have long since disappeared.



Old X-ray binaries in the globular cluster 47 Tuc observed by the Chandra X-ray observatory



more than 1,000,000 B.C.E.



Approx. 500 B.C.E.



2,013 C.E.

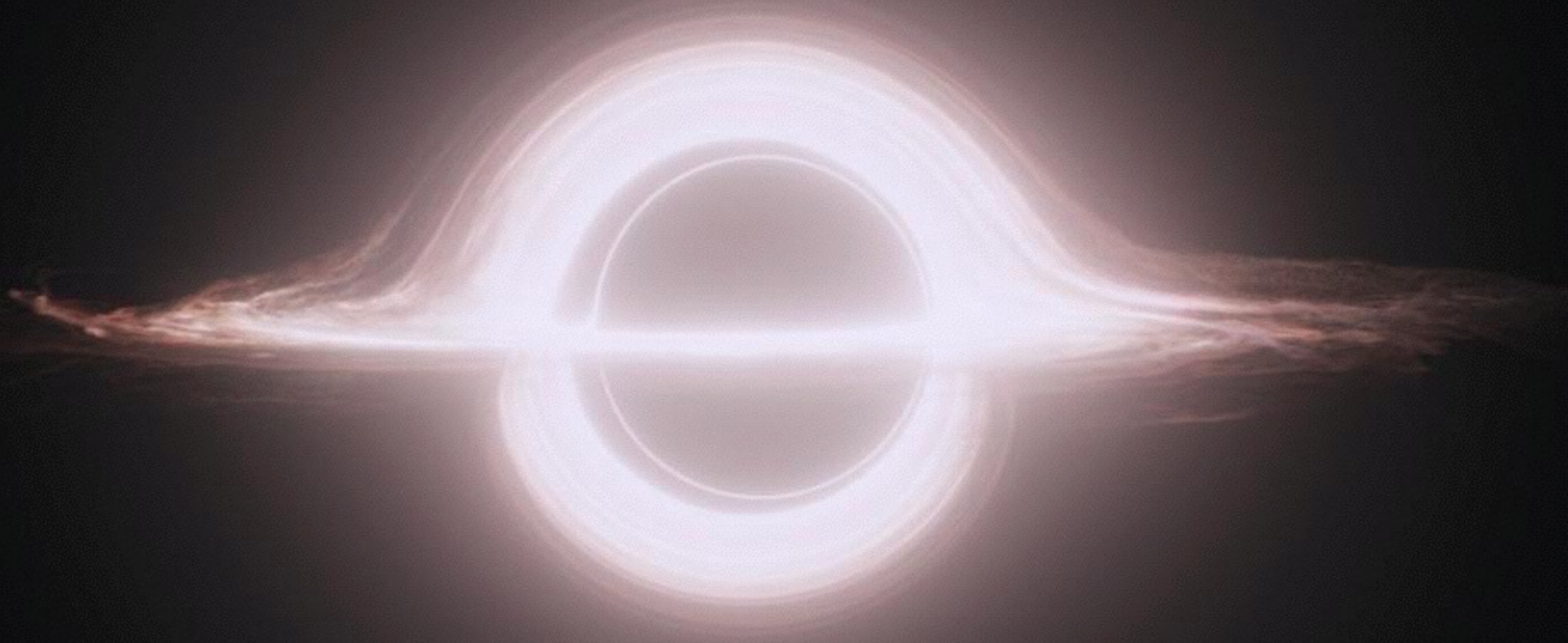


More than 1,000,000 C.E.

Time

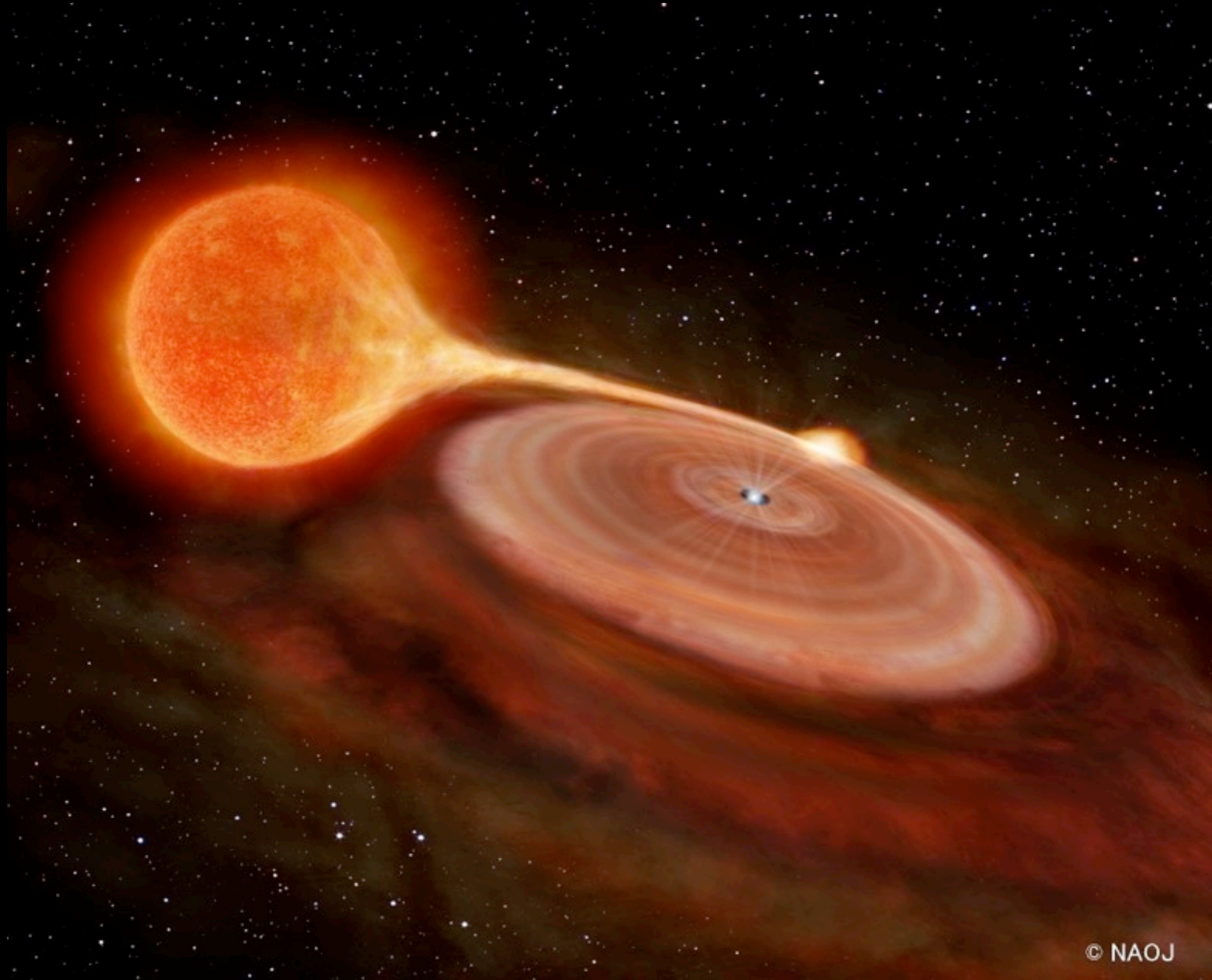
Изображение: Univ. of Wisconsin-Madison/S. Heinz et al

Эволюция Циркуля X-1



Изображение: Double Negative, Warner Bros.

Аккреционный диск



Карликовая новая



<https://www.flickr.com/photos/gsfc/19115493618>

Видео: NASA Goddard Space Flight Center

Аккреция на чёрную дыру



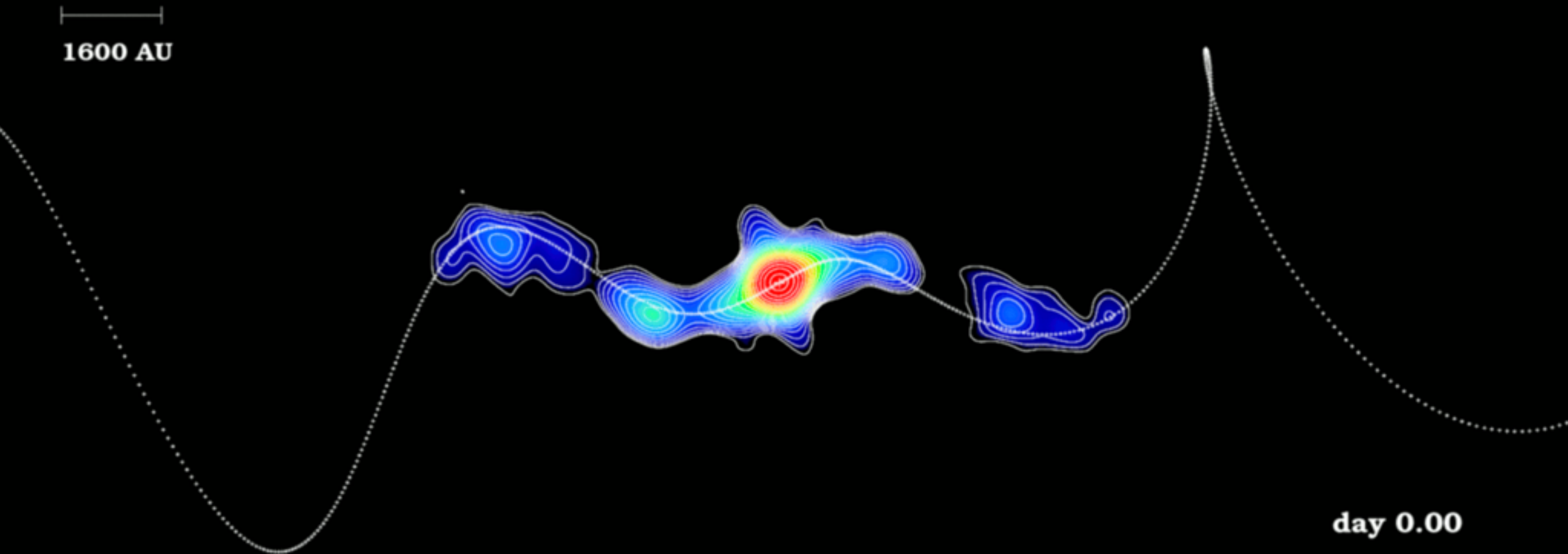
Изображение: NRAO/AUI/NSF, K. Golap, M. Goss; NASA's WISE

Остаток сверхновой



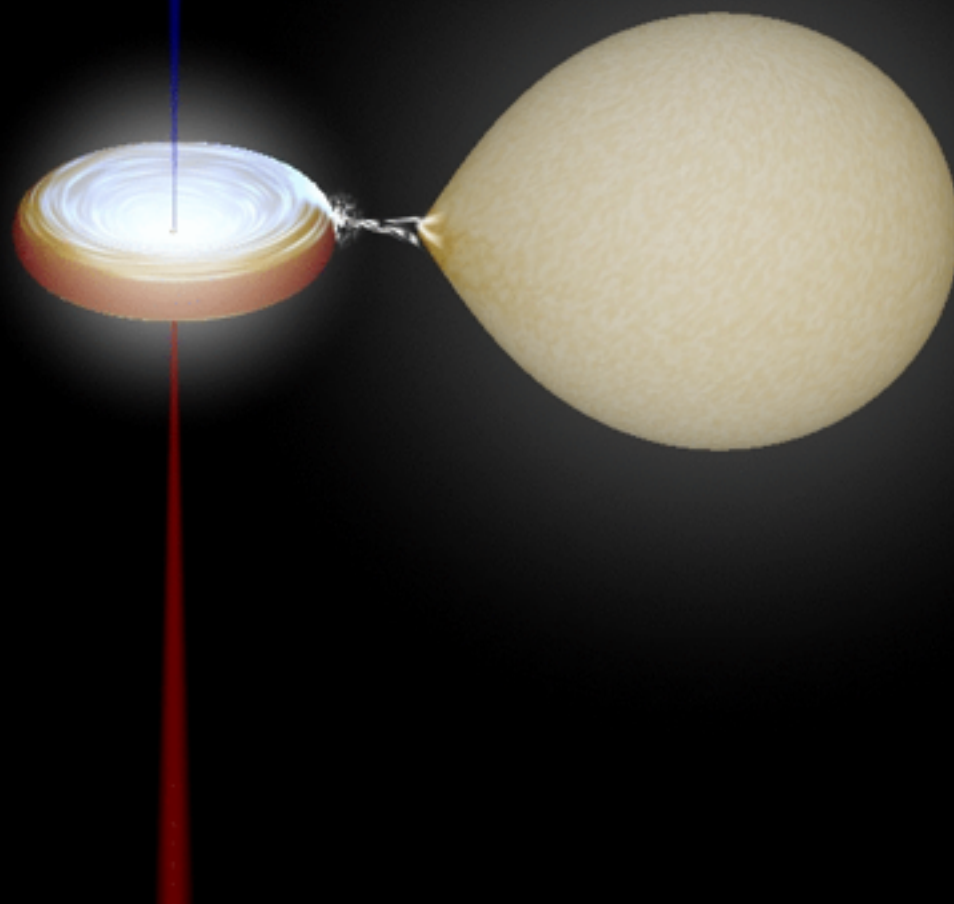
Фото: T. Colson

Ламантин



Анимация: А. Mioduszewski et al., NRAO/AUI/NSF

Микроквазар SS 433



Анимация: Robert Hynes, Tania Burchell

Микроквазар SS 433

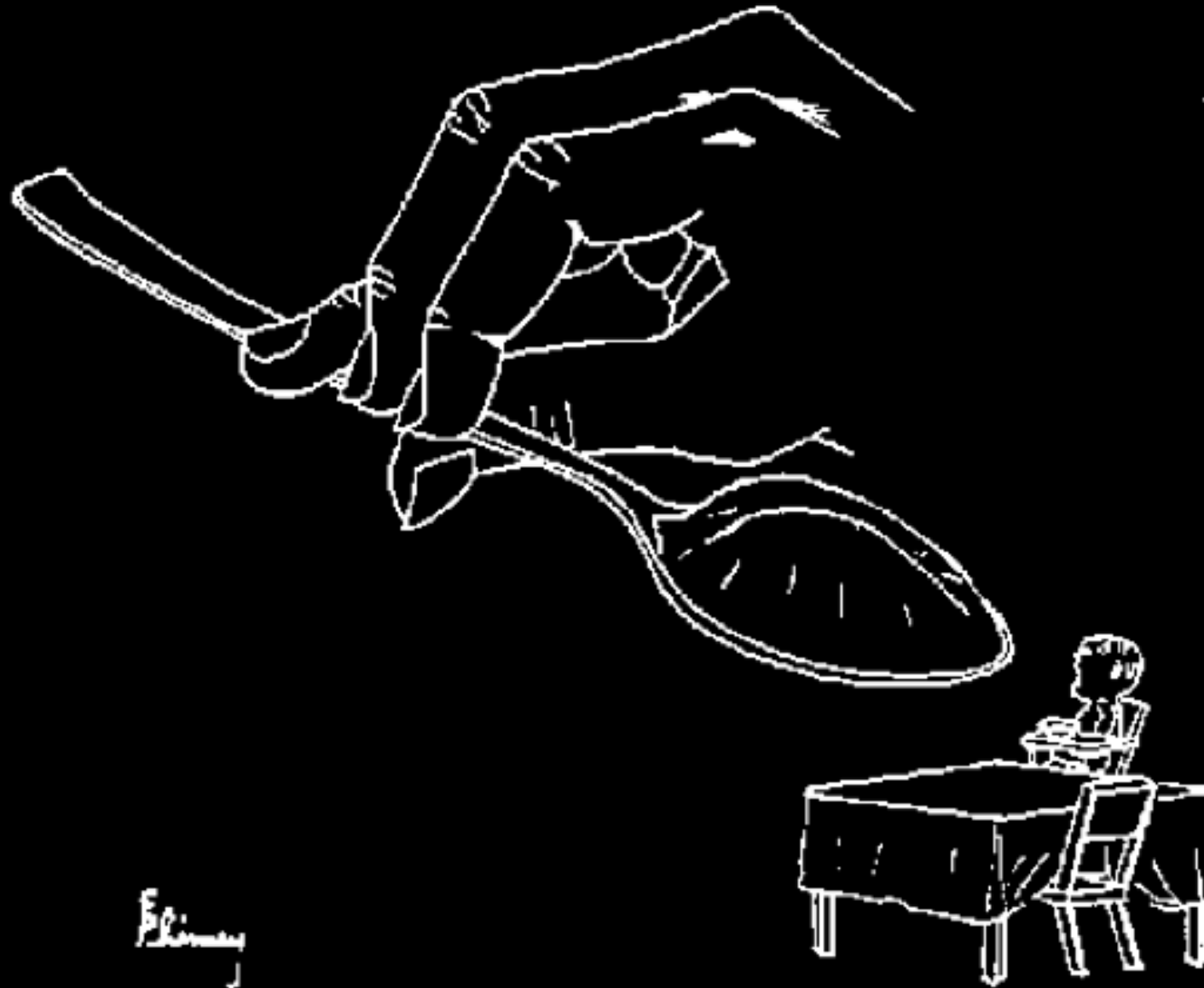
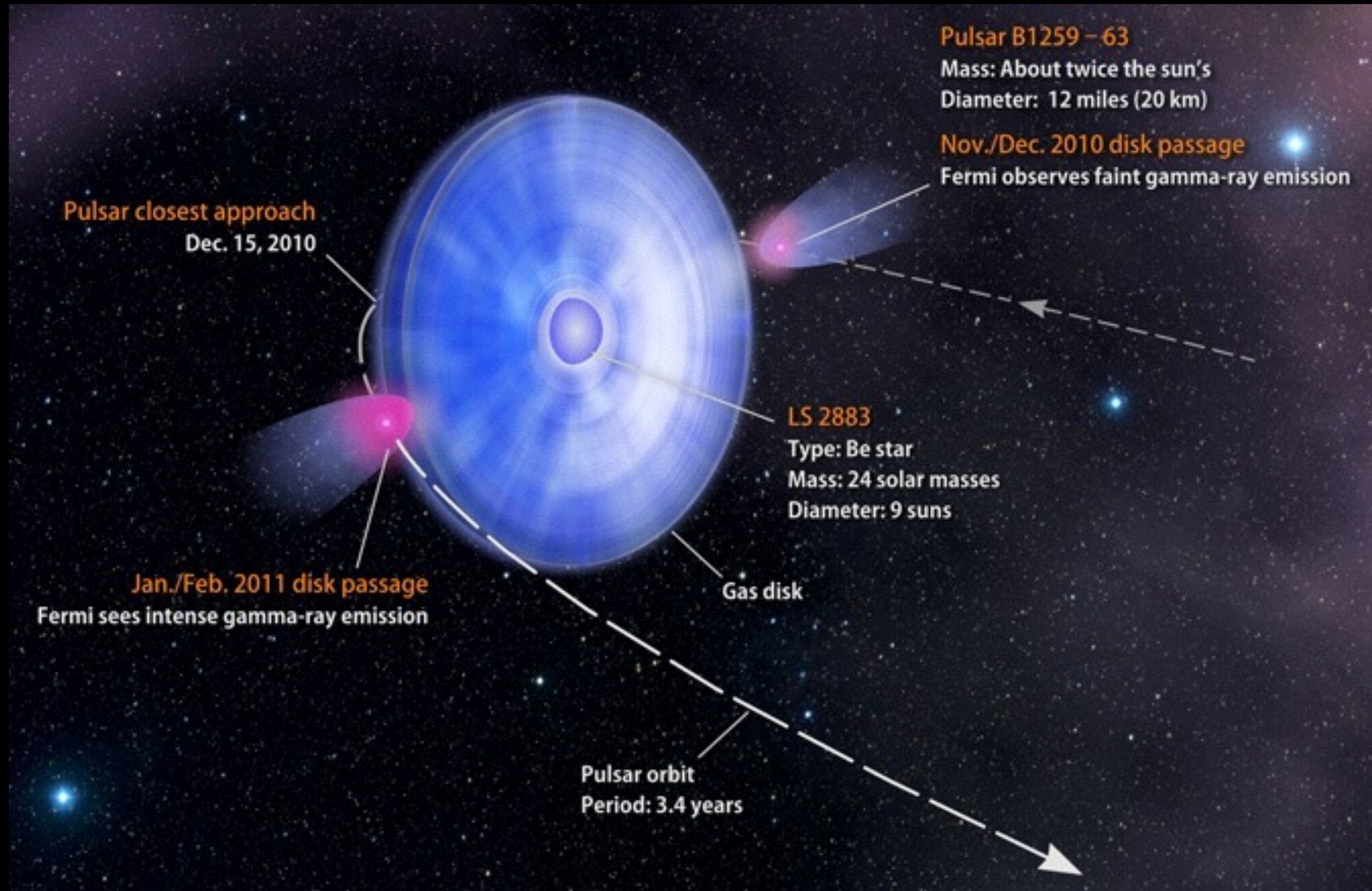


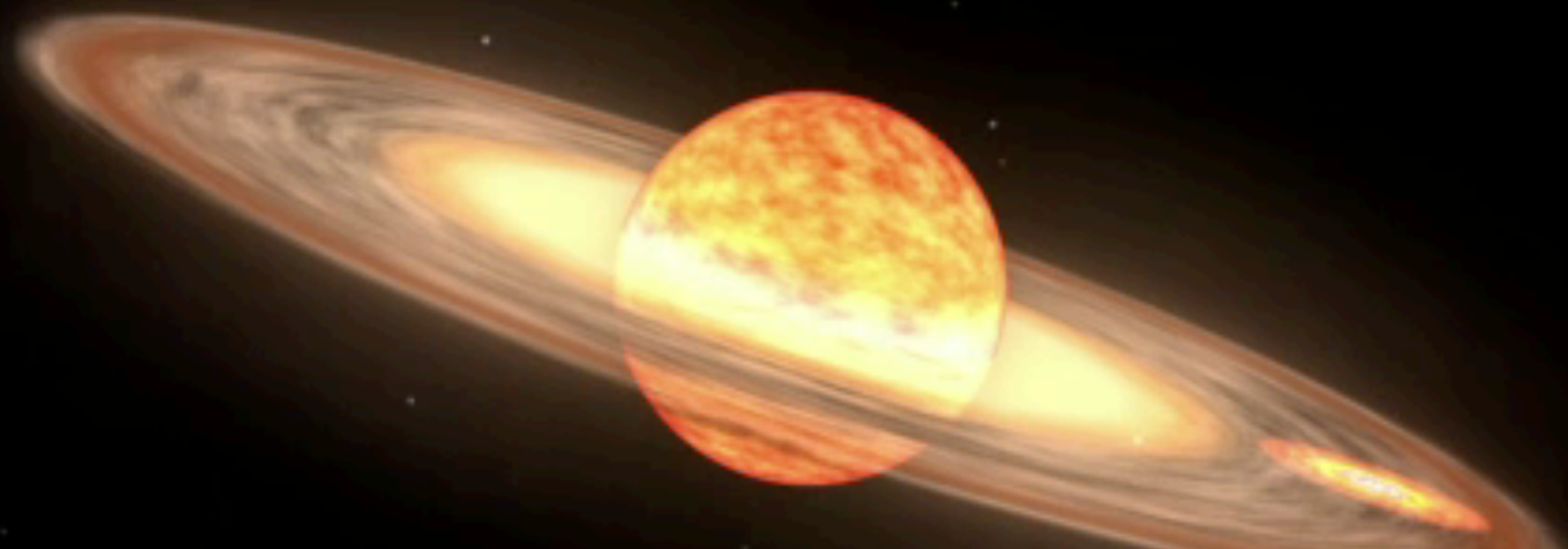
Fig. 1—The problem of feeding the monster: a large (angular momentum) spoon and a small (angular momentum) mouth. Hands and teeth (gravitational and magnetic forces, viscosity, ...) are needed to guide and divide the food into morsels that can be metabolized during activity.

Сверхкритическая аккреция



Изображение: NASA/Goddard Space Flight Center/Francis Reddy

Пролет нейтронной звезды через ОКОЛОЗВЕЗДНЫЙ ДИСК



<https://www.flickr.com/photos/gsfcr/4889085984>

Видео: NASA Goddard Space Flight Center

Новая — термоядерный взрыв
на белом карлике



Спасибо за внимание