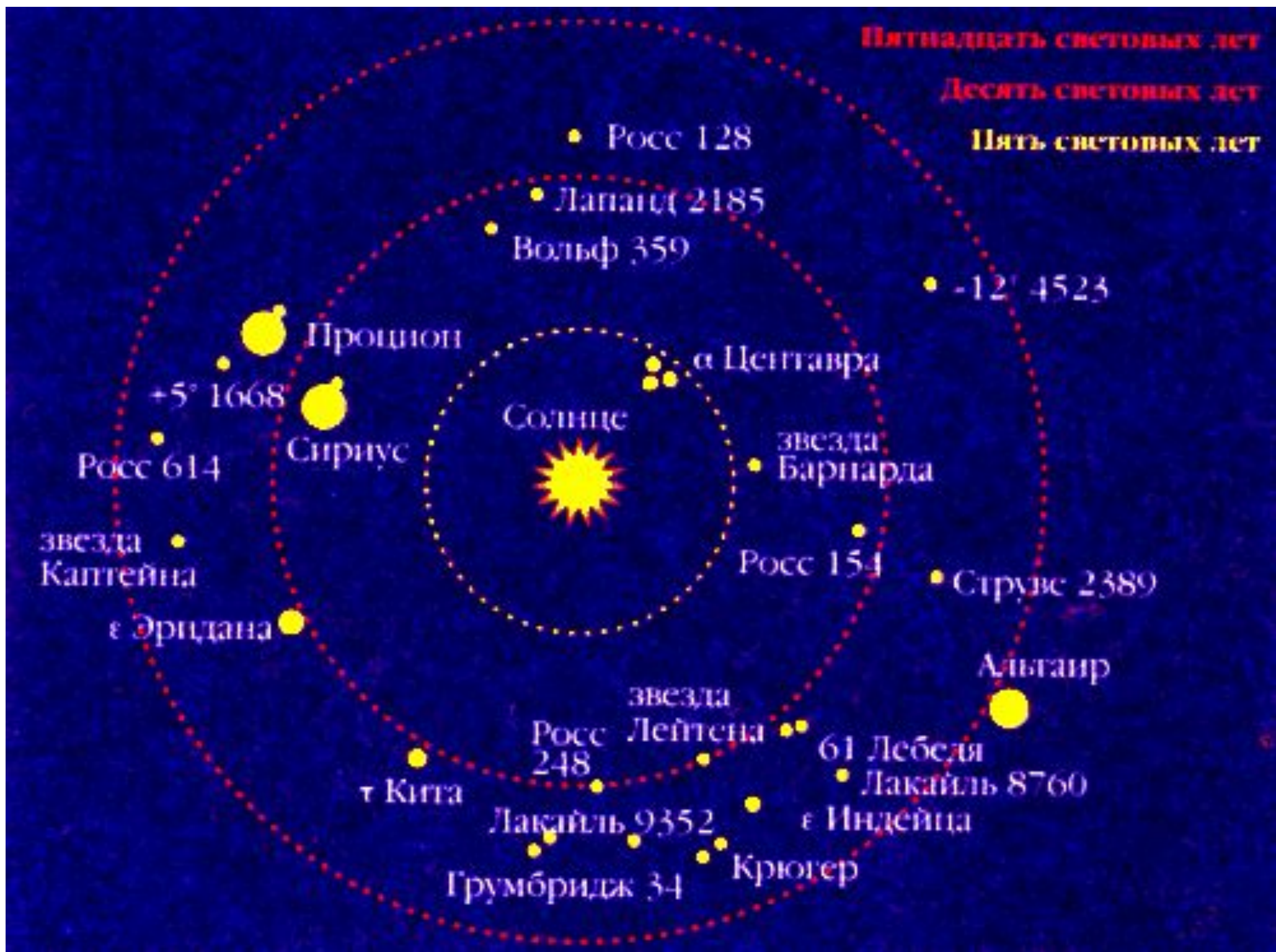
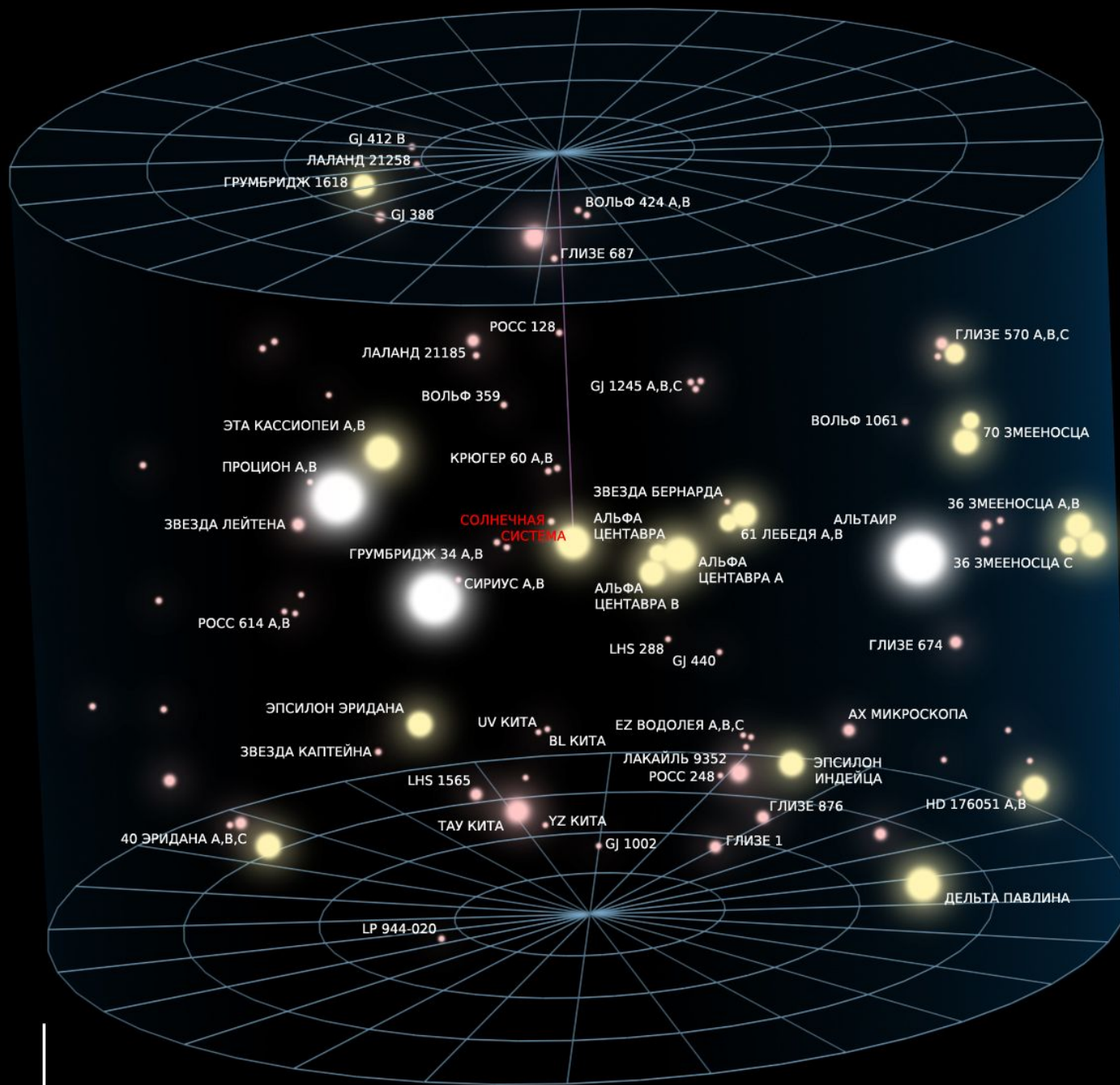
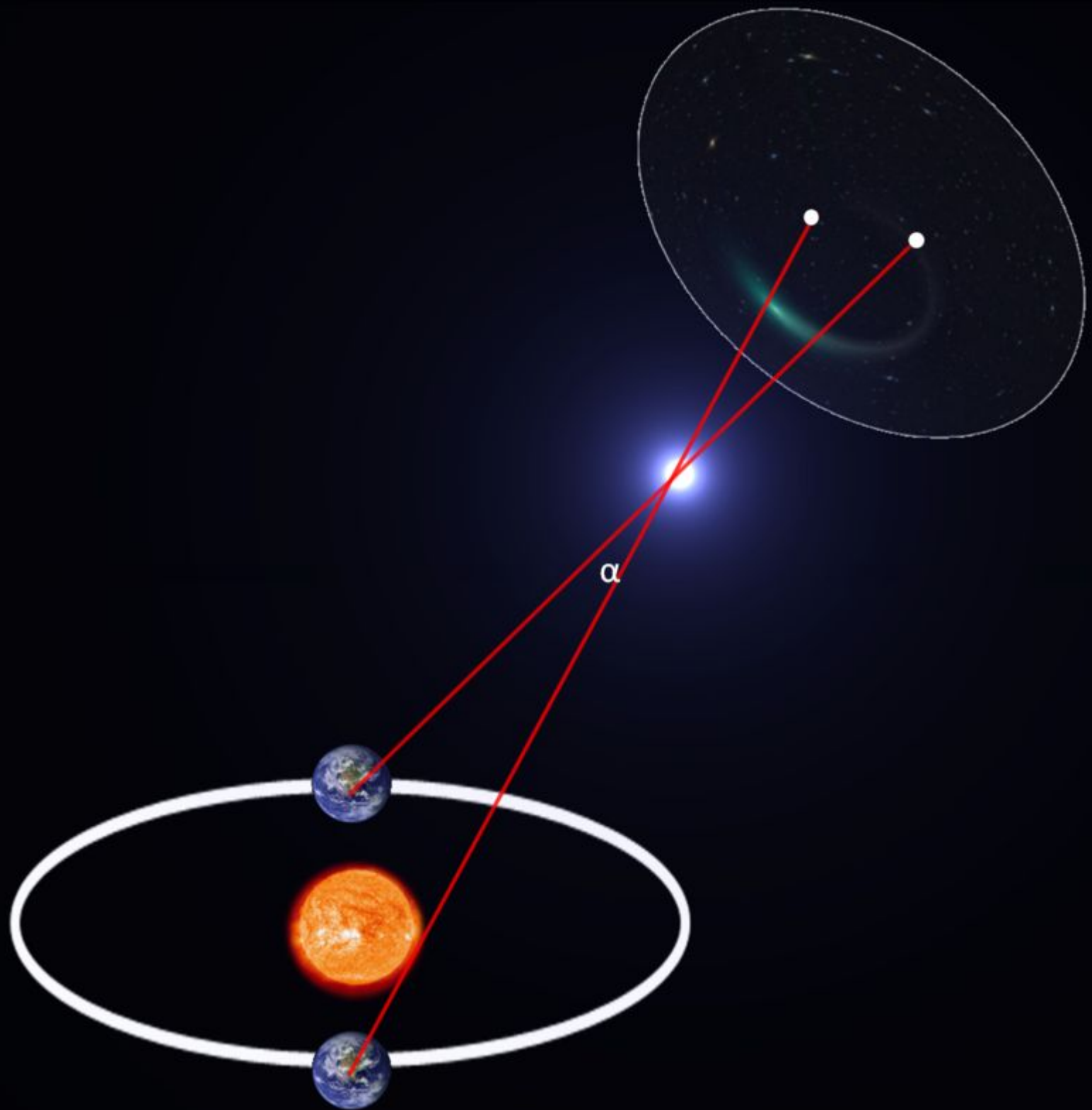
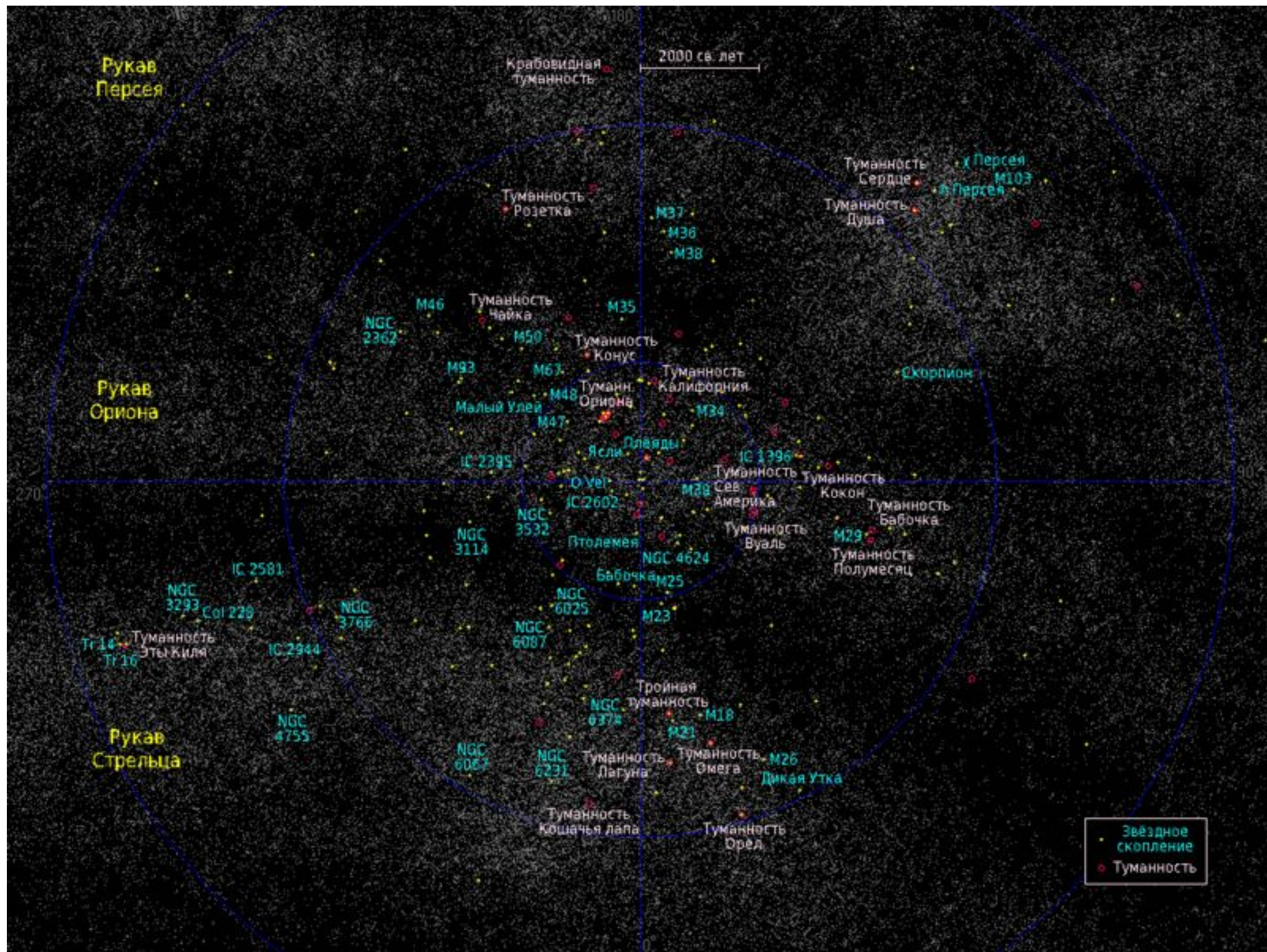


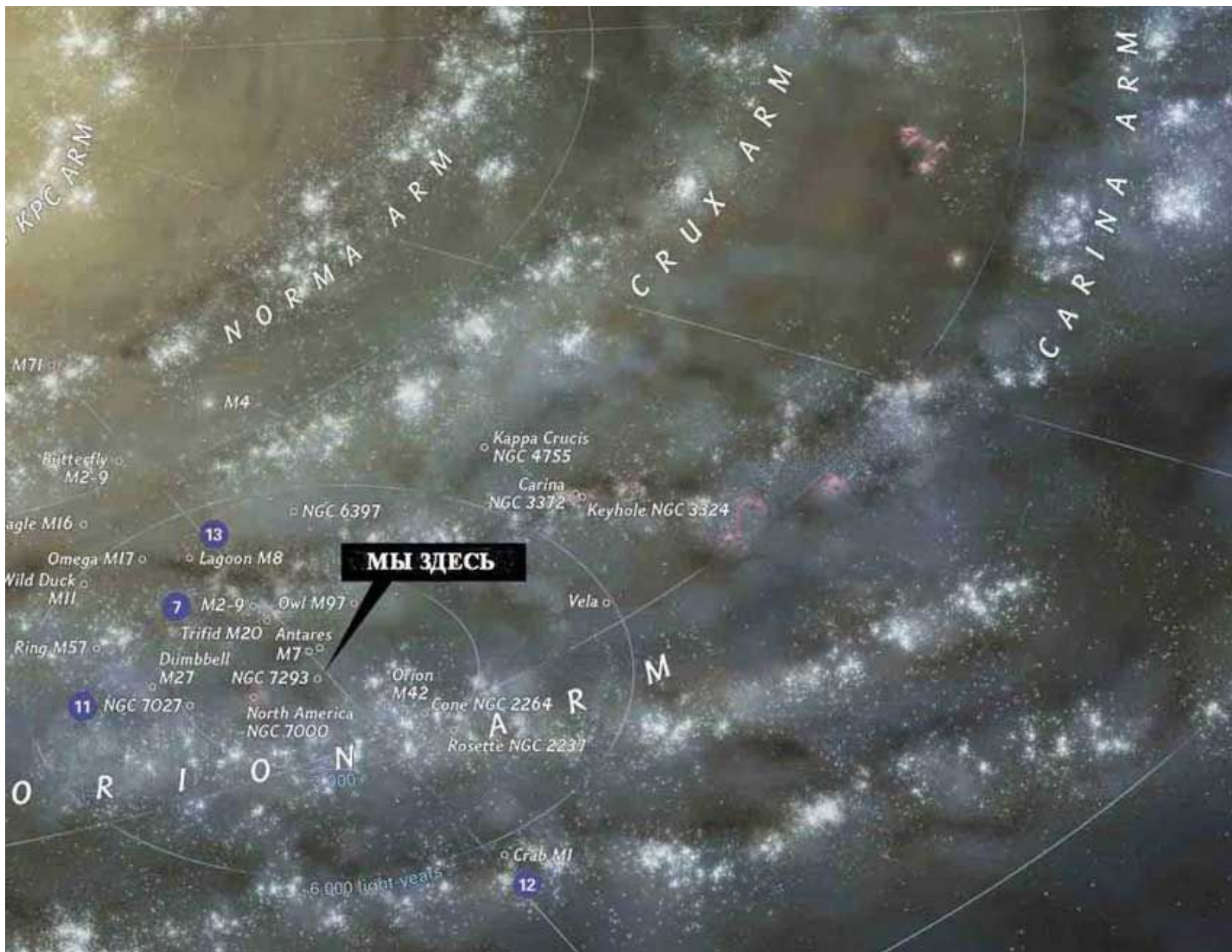




40 световых лет



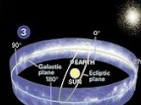




NATIONAL
GEOGRAPHIC

GUIDE TO THE GALAXY

- 1 Far beyond the galactic disk, yet drawn by its gravity, lone stars and globular clusters wander the galaxy's halo. Regions of dark matter—unseen but felt through its gravitational effects—extend beyond that.
- 2 Vast clouds of interstellar dust block much of our night sky view of the Milky Way, which from our position in the flat galactic disk appears as a fuzzy band of light. Infrared satellites can see through the dust to reveal the galaxy's structure.
- 3 Earth's orbit around the sun lies at a severe angle to the galactic plane.



A TURBULENT HEART

- 4** A graph based on a radio survey reveals the whirlpool motion of molecules in the inner part of our galaxy; gas moving away from Earth (top half) and toward Earth (bottom half). The densest gas appears white; lesser dense, blue.
- 5** Massive amounts of energy are released near the center of the Milky Way, producing electrons that race along magnetic field lines, illuminating remnants of stellar explosions.
- Probing even deeper into core, a radio image detects spiral of hot gas that is falling toward what may be a black hole some 2.6 million times as massive as the sun.

This computer-generated image of the Milky Way—one perspective of a 3-D model newly compiled for NATIONAL GEOGRAPHIC—incorporates the actual positions of hundreds of thousands of stars and nebulae.

- 
 Globular star cluster
- 
 Interstellar gas and dust
- 
 Nebula
- 
 Younger star region (OB stars)
- 
 Molecular cloud
- 
 Galactic bulge or center (older star region)

Reference numbers for galaxies,
nebulae, and star clusters
IC (Index Catalog)
M (Messier)
NGC (New General Catalog)
Coordinate system centered
on galactic center

PLANETARY NEBULA M2-9



7 Just as our sun will do in its death throes some five billion years from now, a dying star expanded into a red giant and was transformed into the nebula M2-9 (above). At its center shines

cloud seems to have a silver lining. The million-plus stars packed into a globular cluster such as Omega Centauri (right) are senior citizens of the Milky Way. Unlike human

retirees, however, every star in the cluster is about the same age, billions of years older than our 4.6-billion-year-old sun.

9 Peering between dust clouds toward the central bulge of the Milky Way, the Hubble Space Telescope focused on a rare clear region in the Sagittarius star cloud (above right). These Sagittarius stars formed at different times; most are older



HUBBLE HERITAGE TEAM

than the sun. They sparkle like an assortment of gems on a jeweler's velvet pad.

10 In some dark clouds lurk strange objects like G339.88-1.26, detected by a European Southern Observatory telescope in Chile and mapped in infrared light (right). A star 20 times as massive as the sun and 10,000 times brighter, it sports a disk of circumstellar dust, shown here in false color, about 20,000 times wider than Earth's



orbit. Light from the hot star is absorbed by and warms the dust, making it glow. As stars like the sun die, they become factories for interstellar dust. Celestial soot—the debris of its red giant stage—surrounds the tiny hot central star of NGC 7027 (above right). Blown outward, the soot would obscure our view of the center of NGC 7027 were it not for this remarkable composite image in infrared and

visible light from the Hubble Space Telescope. Clouds of interstellar dust (right), strewn over huge regions along the central plane of the Milky Way, are not thick and smooth but seem as frothy as the head on a glass of beer. Supernova shock waves and stellar wind from

When a massive star comes to the end of its nuclear fuel supply, it collapses and then rebounds in a brief, powerful explosion, or supernova. The Chinese called these celestial fireworks "guest stars" and recorded one such event in the constellation Taurus in July 1954 that was visible in broad daylight.

12 In that location today astronomers find the fast-expanding Crab Nebula (left), a supernova remnant. At its heart lies a pulsar—a collapsed star—whirling 30 times a second.

Satellite galaxies of the Milky Way host equally remarkable celestial phenomena. In the Large Magellanic Cloud (above right), 180,000 light-years from

Earth, clumpy, filamentary clouds of hydrogen gas reveal their stately march in a radio map from the Australia Telescope Compact Array. The lower half of the cloud (blue) is rotating toward the Earth while the top (red) turns away.

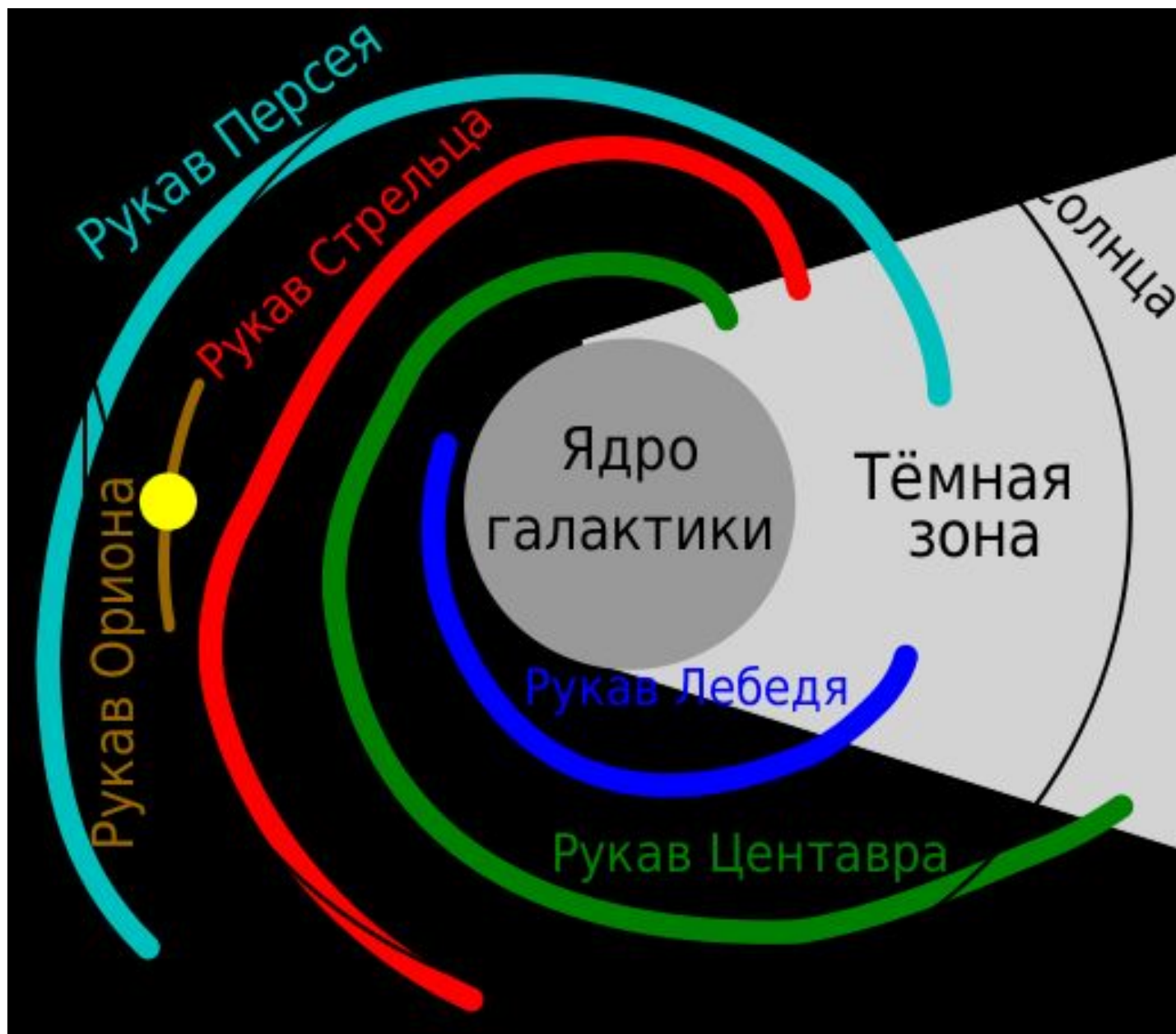
13 Glittering along the spiral arms of the galaxy, the Lagoon Nebula marks regions where new stars are forming. The Lagoon Nebula (above), about 5,600 light-years distant, is easily detected with the naked eye as a fuzzy spot in the southern constellation Sagittarius. Wide-field images show that it covers more of

the sky than does the full moon. Where there was once only a vast dark cloud, radiation from the brightest and most massive young star in the nebula, Herschel 38, heats and ionizes the gas across a wide region. Despite the brilliance of the Lagoon Nebula and similar objects like the famous Orion Nebula, such areas are usually little more than hot blisters on the flanks of giant interstellar clouds.

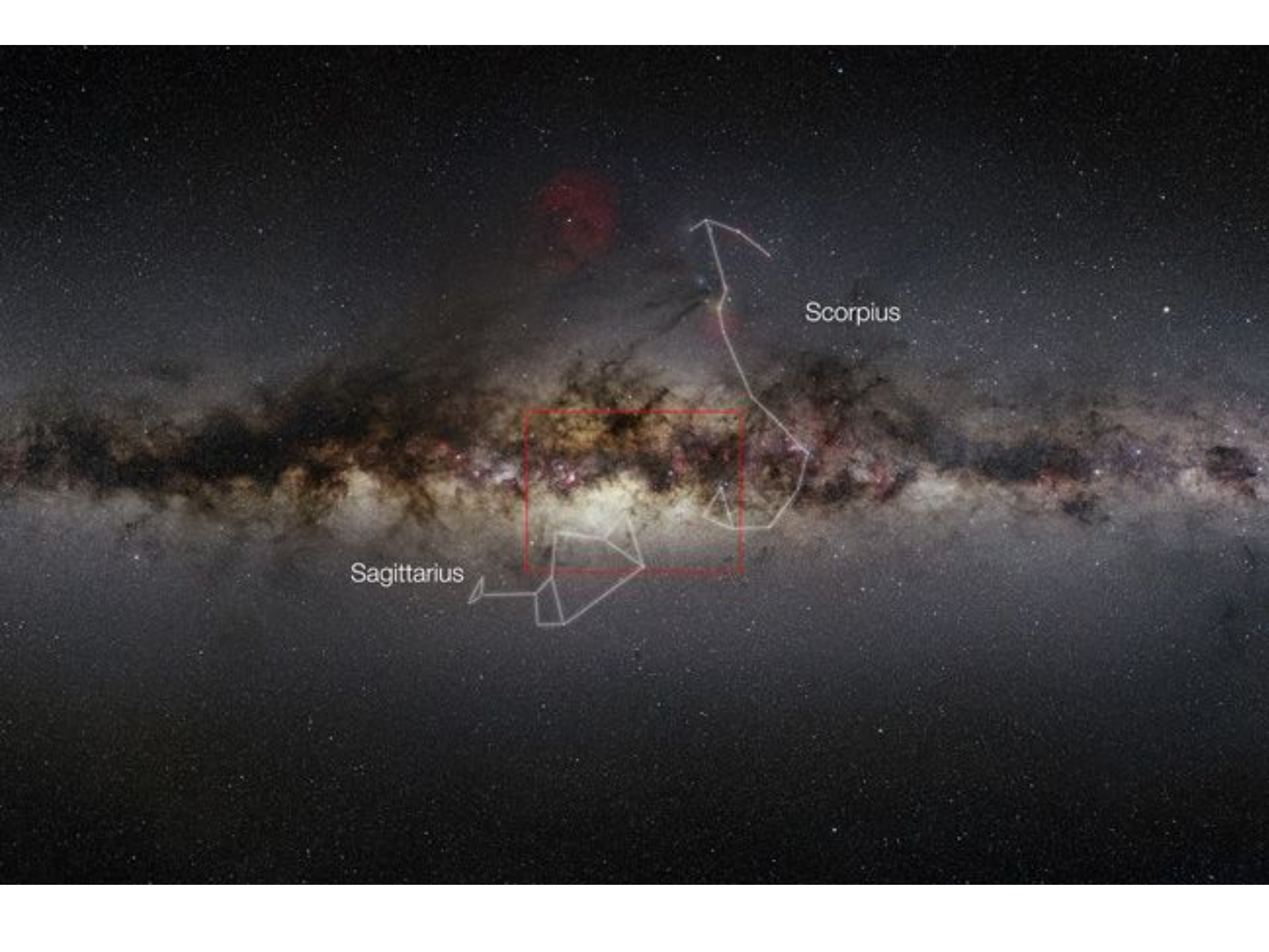
With new tools, astronomers are unraveling the nature of the Milky Way and measuring distances to stars and nebulae with greater accuracy. Still, they ask, how did the Milky Way form in the first place? How and when did the arms form? How many more planets circle nearby stars besides the 102 already discovered? And the biggest question of all: Do any of them harbor life?

LAGOON NEBULA



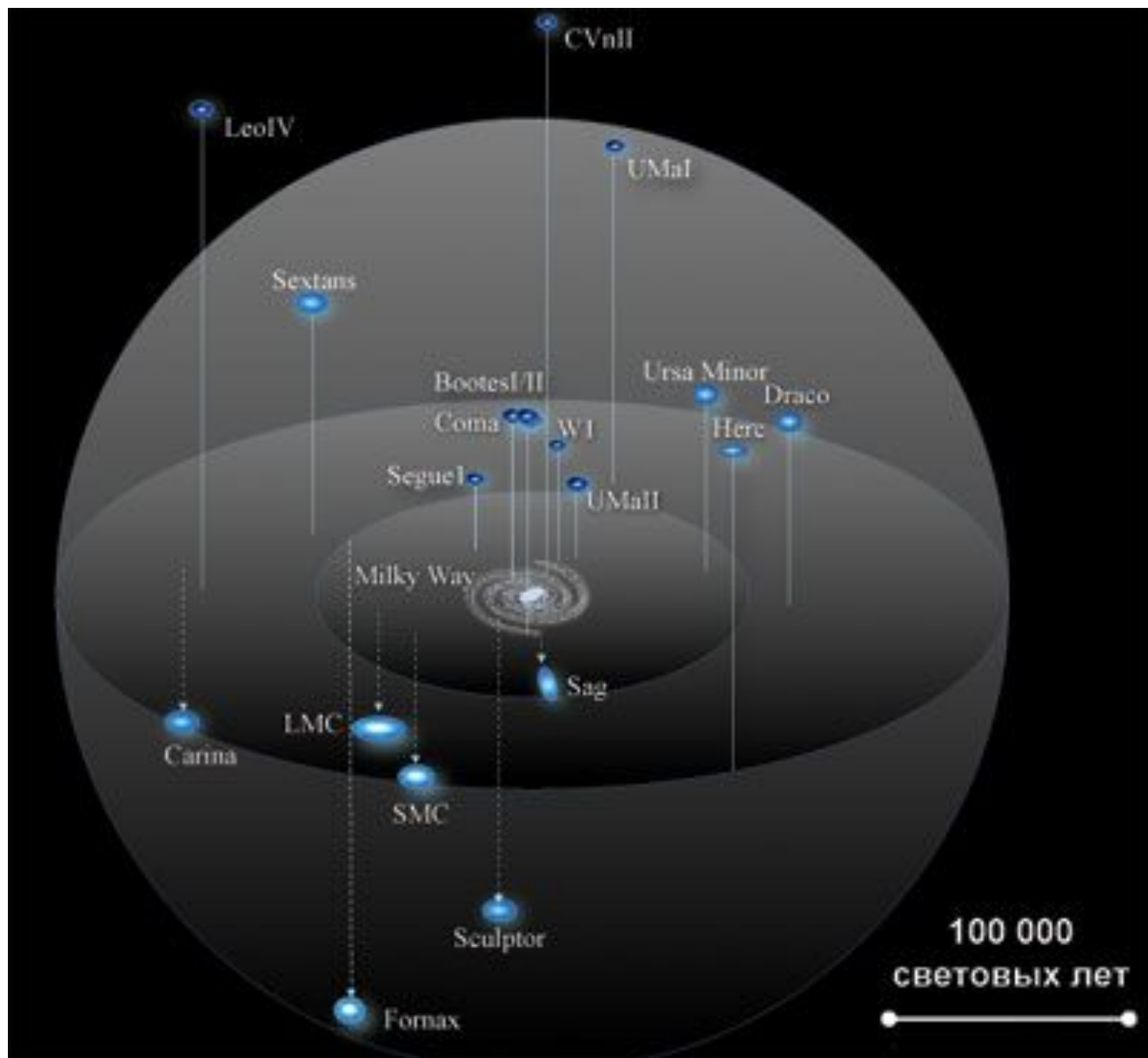






Scorpius

Sagittarius



ГАЛАКТИЧЕСКАЯ КОРОНА
Горячий газ, окружающий Галактику

ВЫСОКОСКОРОСТНОЕ ОБЛАКО
Влетающий сгусток
сравнительно свежего газа

ДИСК ГАЛАКТИКИ
Сплюснутая система
звезд, газа
и пыли

ПУЗЫРЬ
Газ, нагретый
сверхновыми;
источник
«фонтана»

ОБЛАКО С
ПРОМЕЖУТОЧНОЙ
СКОРОСТЬЮ
Остывший газ;
возвратный поток
«фонтана»

БОЛЬШОЕ МАГЕЛЛАНОВО
ОБЛАКО
Галактика – спутник
Млечного Пути

МАЛОЕ МАГЕЛЛАНОВО ОБЛАКО
Галактика – спутник Млечного Пути

КАРЛИКОВАЯ СФЕРОИДАЛЬНАЯ
ГАЛАКТИКА В СТРЕЛЬЦЕ
Галактика – спутник Млечного Пути

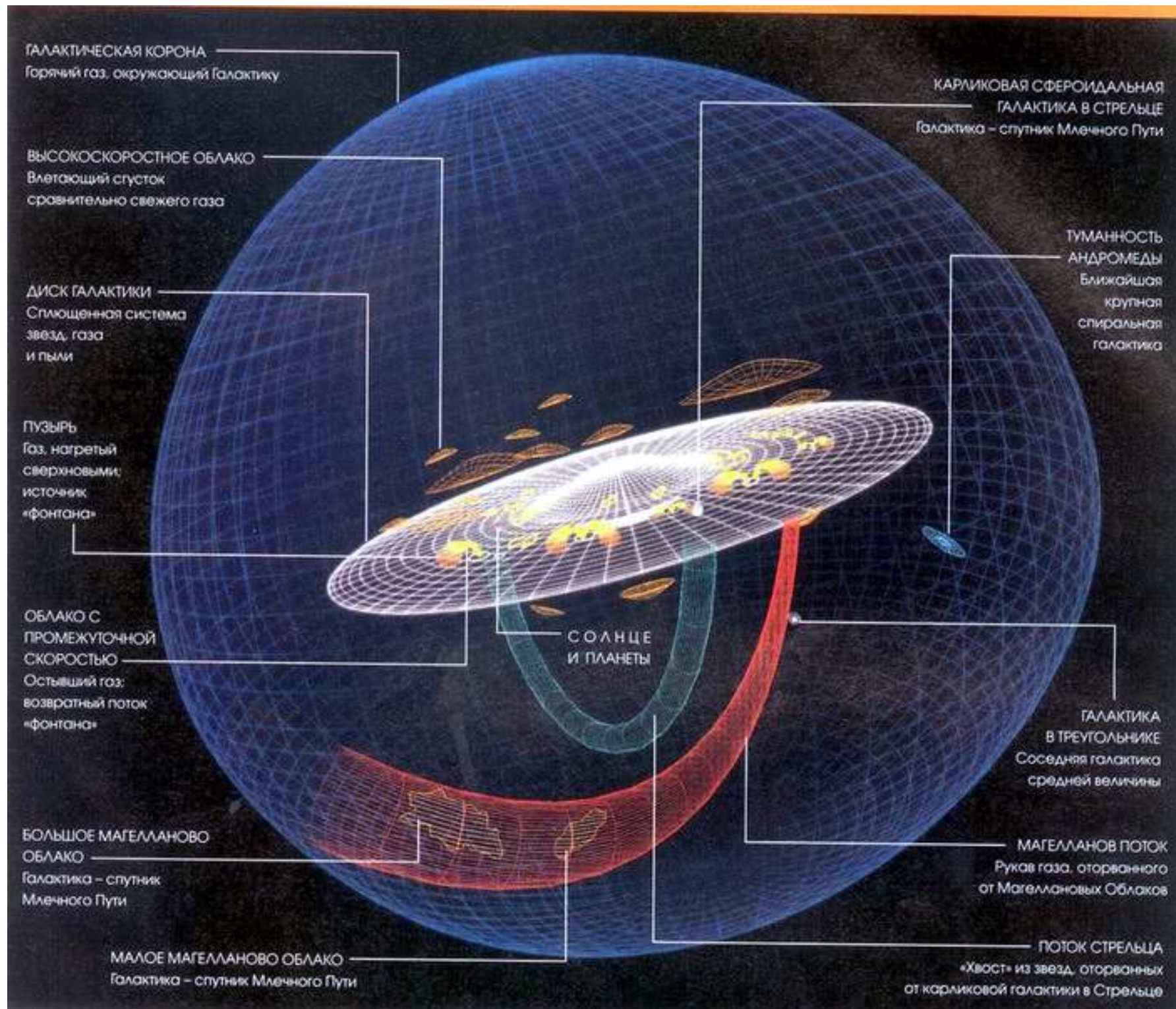
ТУМАННОСТЬ
АНДРОМЕДЫ
Ближайшая
крупная
спиральная
галактика

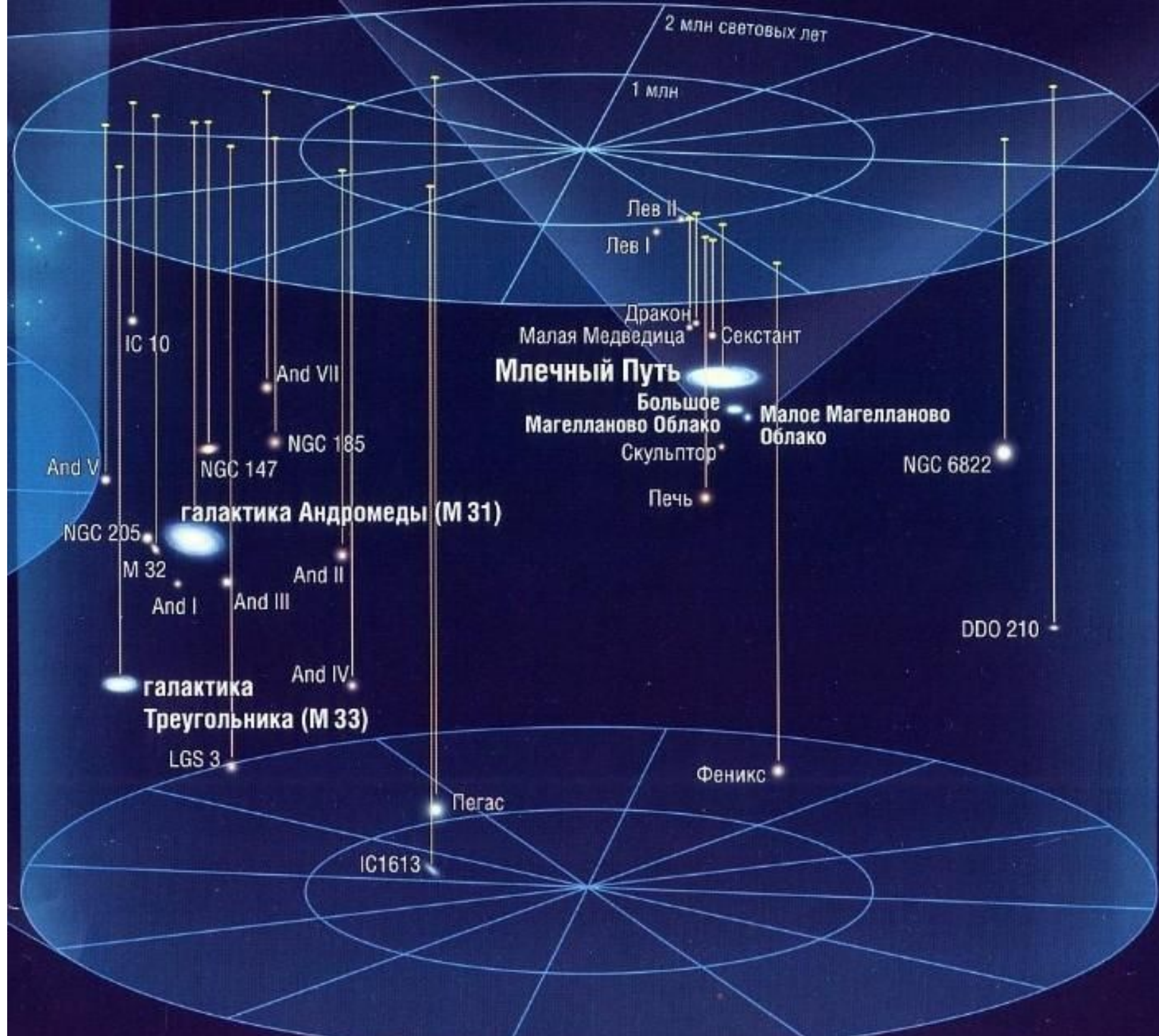
ГАЛАКТИКА
В ТРЕУГОЛЬНИКЕ
Соседняя галактика
средней величины

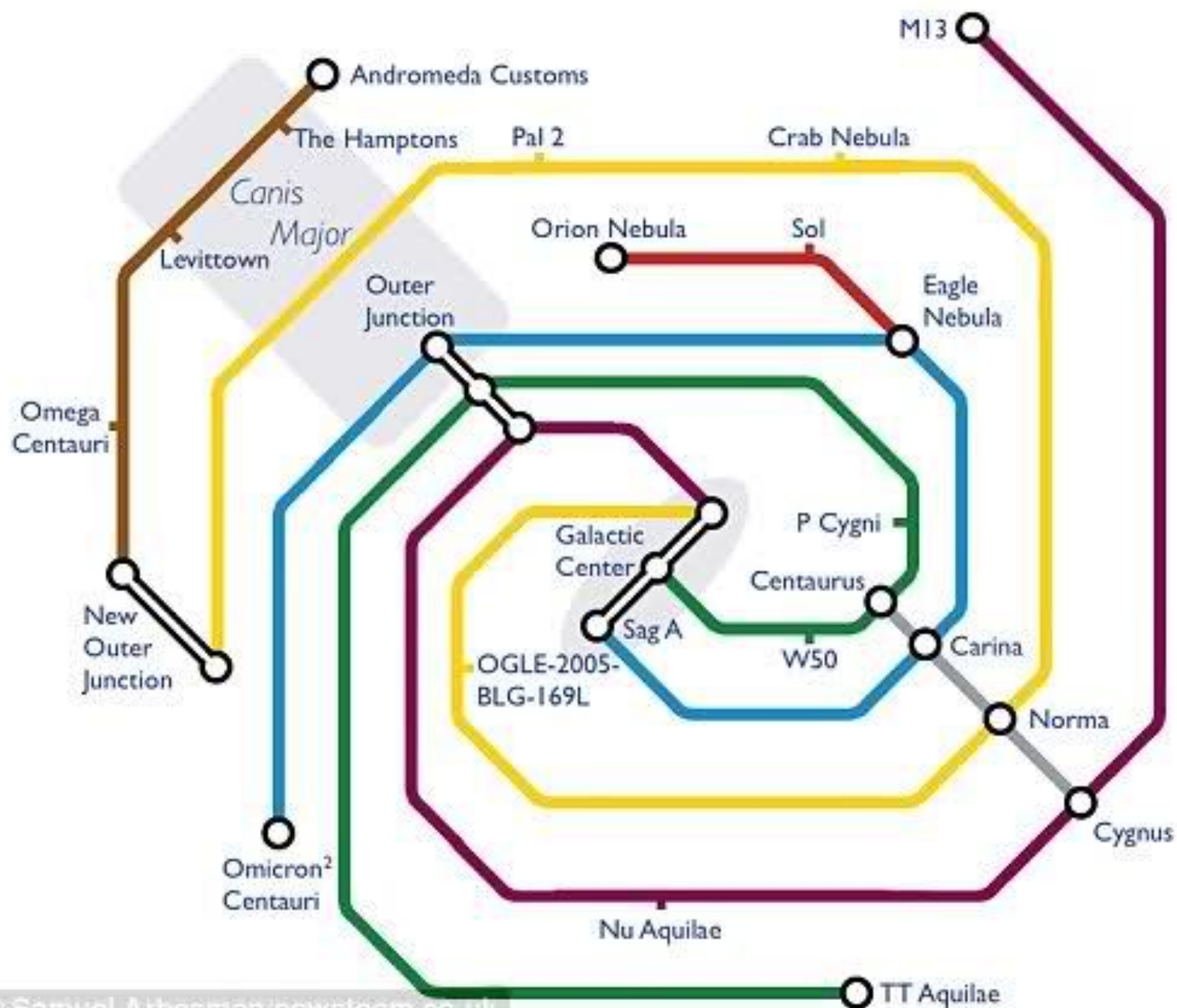
МАГЕЛЛАНОВ ПОТОК
Рукав газа, оторванного
от Магеллановых Облаков

ПОТОК СТРЕЛЬЦА
«Хвост» из звезд, оторванных
от карликовой галактики в Стрельце

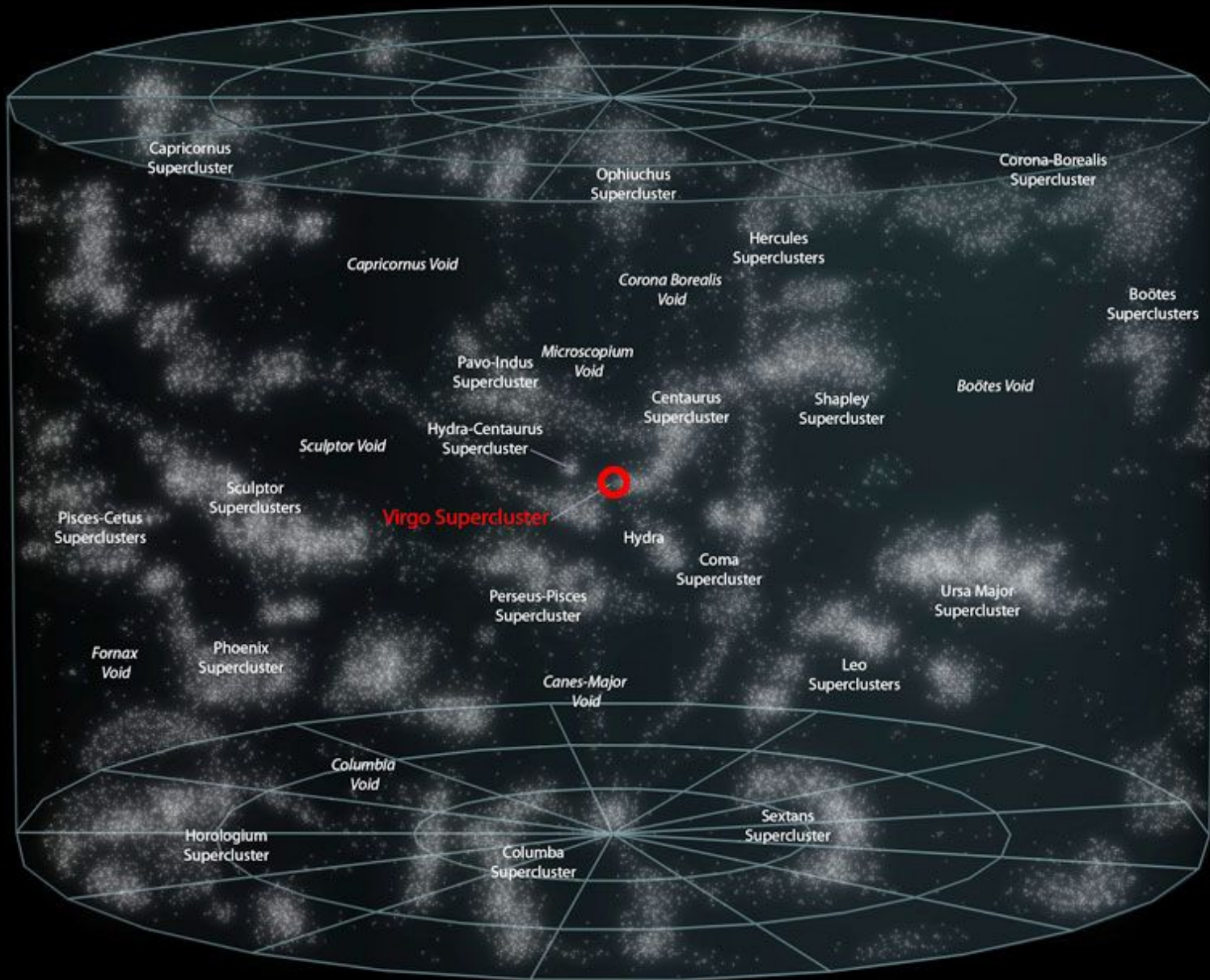
СОЛНЦЕ
И ПЛАНЕТЫ





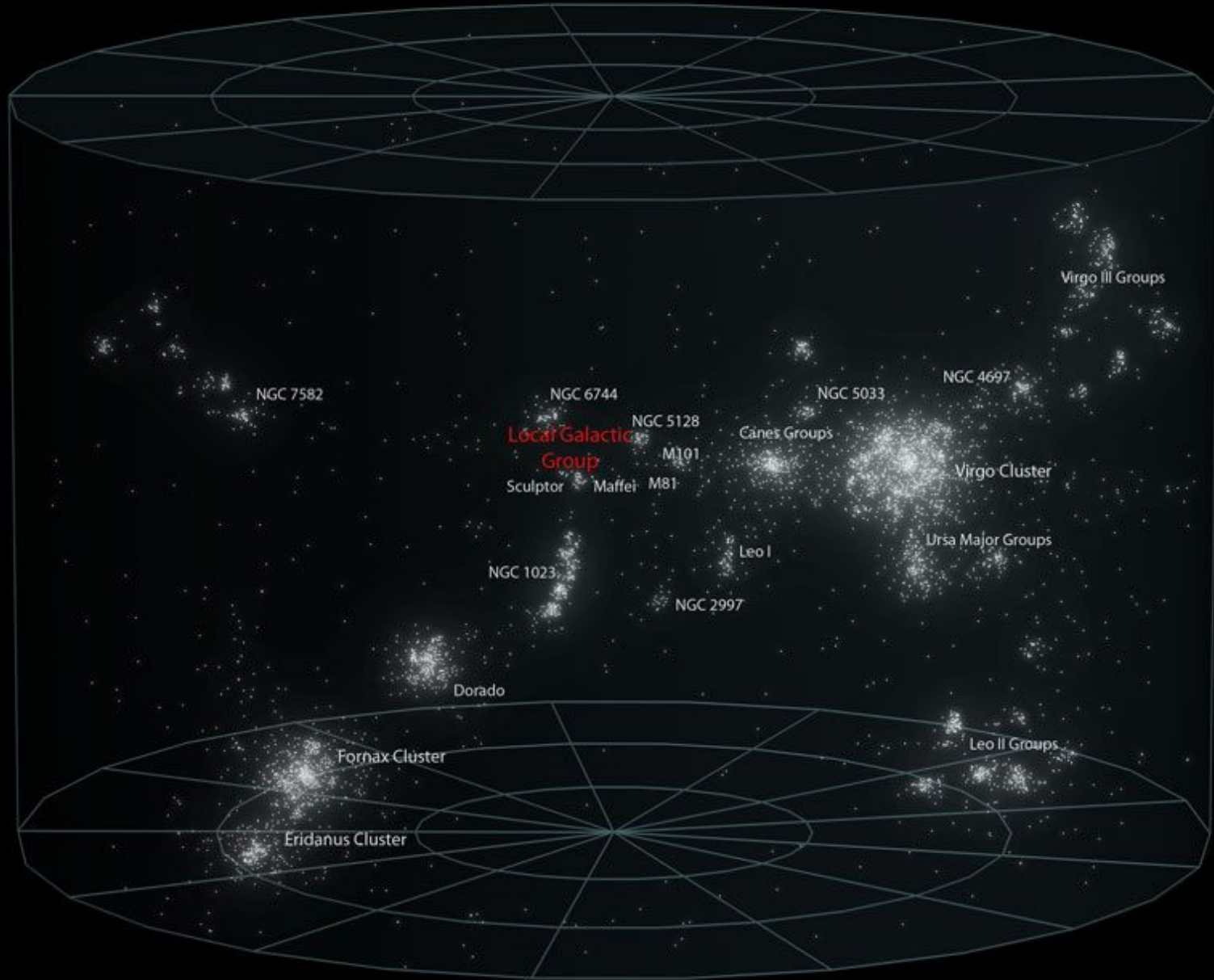


Local Superclusters

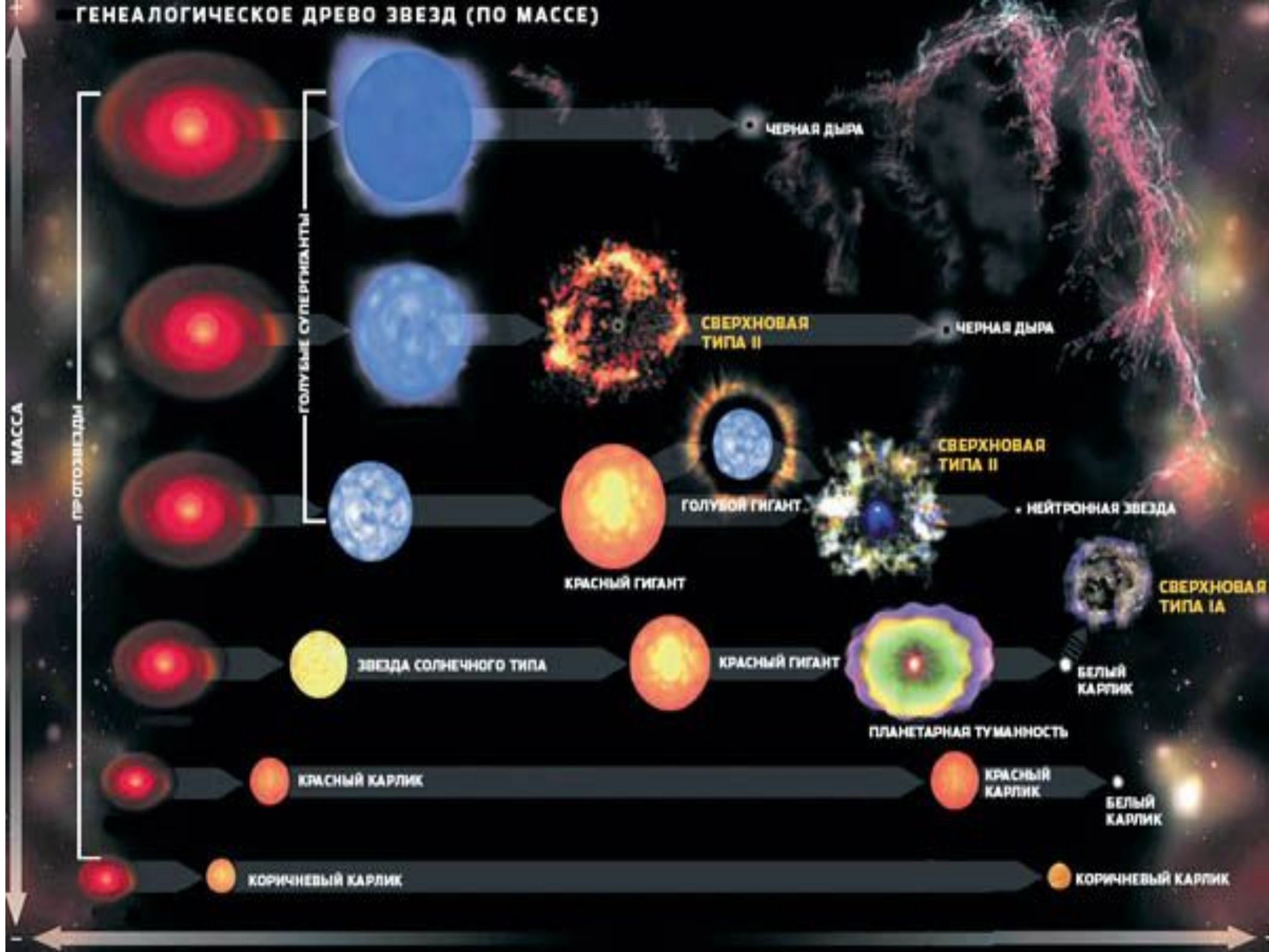




Virgo Supercluster



ГЕНЕАЛОГИЧЕСКОЕ ДРЕВО ЗВЕЗД (ПО МАССЕ)



• Тёмная туманность



Отражательная туманность



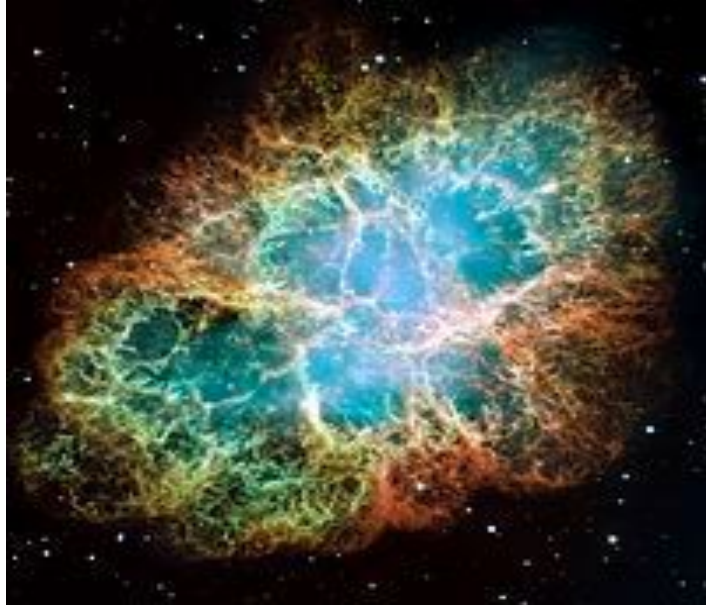
• Туманности ионизованные



Планетарные туманности



- Остаток сверхновой



Туманности, созданные ударными



- Туманности вокруг О-звёзд

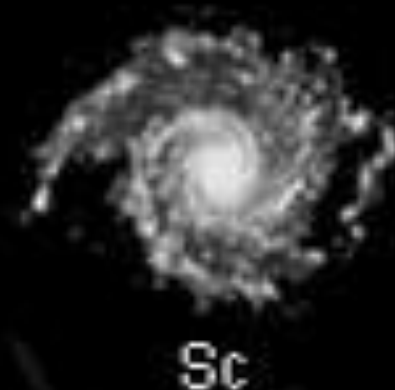


Туманности в областях





Спиральные галактики



Эллиптические галактики



Sa

S₀

Спиральные галактики с перемычкой



SBa

SBb

SBc