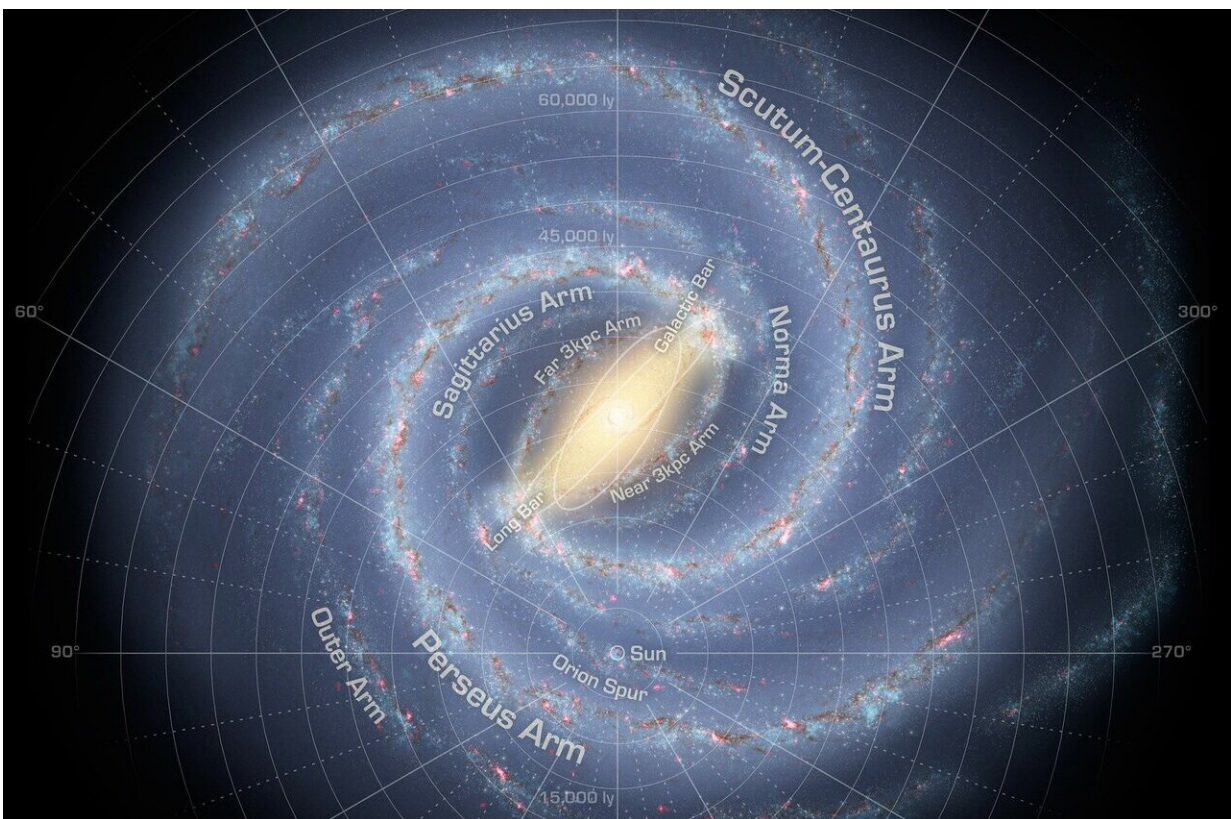


# Fast-rotating stars at the centre of the Milky Way could have migrated from the outskirts of the galaxy

September 30 2020



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In a research paper published by *The Astrophysical Journal Letters*, an international team of astrophysicists, including scientists from the

University of Surrey, detail how they discovered a group of stars with different characteristics than their neighbors found in the Milky Way's Nuclear Star Cluster (NSC).

The team used state-of-the-art high-resolution computer simulations to explain how this group of metal-poor and fast-rotating [stars](#) came to be located at the center of our galaxy.

Their calculations found that it is likely that this group of stars are leftovers from the migration of a massive star [cluster](#) that formed a few light-years away from the Milky Way's center. Alternatively, while not as likely as the cluster scenario, the team also noted that the group of stars could possibly have originated from a dwarf galaxy located up to 320,000 light-years away from the galactic center.

All evidence points towards an accretion event that happened 3-5 billion years ago during which a massive cluster migrated towards the center of the Milky Way and was disrupted by the strong tidal forces of the NSC, a region of high stellar density. Cluster stars were deposited in the region and were discovered based on their peculiar velocities and low metal content.

Dr. Alessia Gualandris, senior lecturer in physics from the University of Surrey, added: "This discovery may be the 'smoking gun' evidence that the Milky Way has been accreting star clusters or dwarf [galaxies](#) over its lifetime. Its past was much more active than we previously thought."

Dr. Tuan Do, assistant research scientist at UCLA, said: "It is remarkable how these new observations of the NSC can reveal so much about the history of the whole galaxy."

Dr. Manuel Arca-Sedda, a Humboldt Fellow at the Astronomisches Rechen-Institut, Heidelberg, concluded: "A close collaboration between

observers and theorists has been key in this study. Combining new exquisite observations with state-of-the-art computer models has allowed us to uncover the birthplace of these peculiar stars".

**More information:** Tuan Do et al. Revealing the Formation of the Milky Way Nuclear Star Cluster via Chemo-dynamical Modeling, *The Astrophysical Journal* (2020). [DOI: 10.3847/2041-8213/abb246](https://doi.org/10.3847/2041-8213/abb246)

Manuel Arca Sedda et al. On the Origin of a Rotating Metal-poor Stellar Population in the Milky Way Nuclear Cluster, *The Astrophysical Journal* (2020). [DOI: 10.3847/2041-8213/abb245](https://doi.org/10.3847/2041-8213/abb245)

Provided by University of Surrey

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