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Citation

Kuhn, M. A., Benjamin, R. A., Zucker, C., Krone-Martins, A., De Souza, R. S., Castro Ginard, A., ... Hillenbrand, L. (2022). Identification of a spur-like structure in the Milky Way's Sagittarius arm. *Bulletin Of The American Astronomical Society*, (6). Retrieved from <https://hdl.handle.net/1887/3562728>

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Downloaded from: <https://hdl.handle.net/1887/3562728>

Note: To cite this publication please use the final published version (if applicable).

Bulletin of the AAS • Vol. 54, Issue 6

Identification of a Spur-like Structure in the Milky Way's Sagittarius Arm

**Michael A. Kuhn¹ Robert A. Benjamin² Catherine Zucker³
Alberto Krone-Martins⁴ Rafael S. de Souza⁵ Alfred Castro-Ginard⁶
Emille E. O. Ishida⁷ Matthew Povich⁸ Lynne Hillenbrand¹**

¹California Institute of Technology, ²University of Wisconsin, Whitewater,

³Space Telescope Science Institute, ⁴UC Irvine, ⁵Shanghai Astronomical Observatory,

⁶Universiteit Leiden, ⁷Université Clermont Auvergne,

⁸California State Polytechnic University, Pomona

Published on: Jun 29, 2022

URL: <https://baas.aas.org/pub/2022n6i216p01>

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ESA's Gaia mission has provided an unprecedented 3D view of our Solar neighborhood out to several kpc, allowing us to better understand how local star-forming regions fit into our galaxy's spiral structure. We report the identification of a kpc-long spatially and kinematically coherent structure in the Galactic plane between Galactic longitudes 4 deg and 19 deg at a distance of $\sim 1-2$ kpc. This filament-like structure is comprised of groups of young stellar objects (YSOs) identified in the Spitzer/IRAC Candidate YSO (SPICY) catalog and molecular clouds observed by multiple submillimeter surveys. The structure's 3D configuration and motions were derived from Gaia EDR3 astrometry combined with molecular cloud radial velocities. The structure includes several prominent star-forming regions, notably Messier 8, 16, 17, and 20, along with multiple newly identified young stellar groups. These regions have historically formed part of the Sagittarius spiral arm, but the new 3D view shows that this structure is discrete and has a pitch angle ($\psi = 56$ deg) significantly greater than expected for an arm segment. The structure experiences shear of 4.6 km/s/kpc due to Galactic rotation, suggesting a timescale of ~ 90 Myr for the structure to change pitch angle by a factor of 2. The high pitch angle is reminiscent of "spurs" detected in other spiral galaxies, and we discuss alternative interpretations of this structure as a spur or a mass concentration within the Sagittarius Arm.