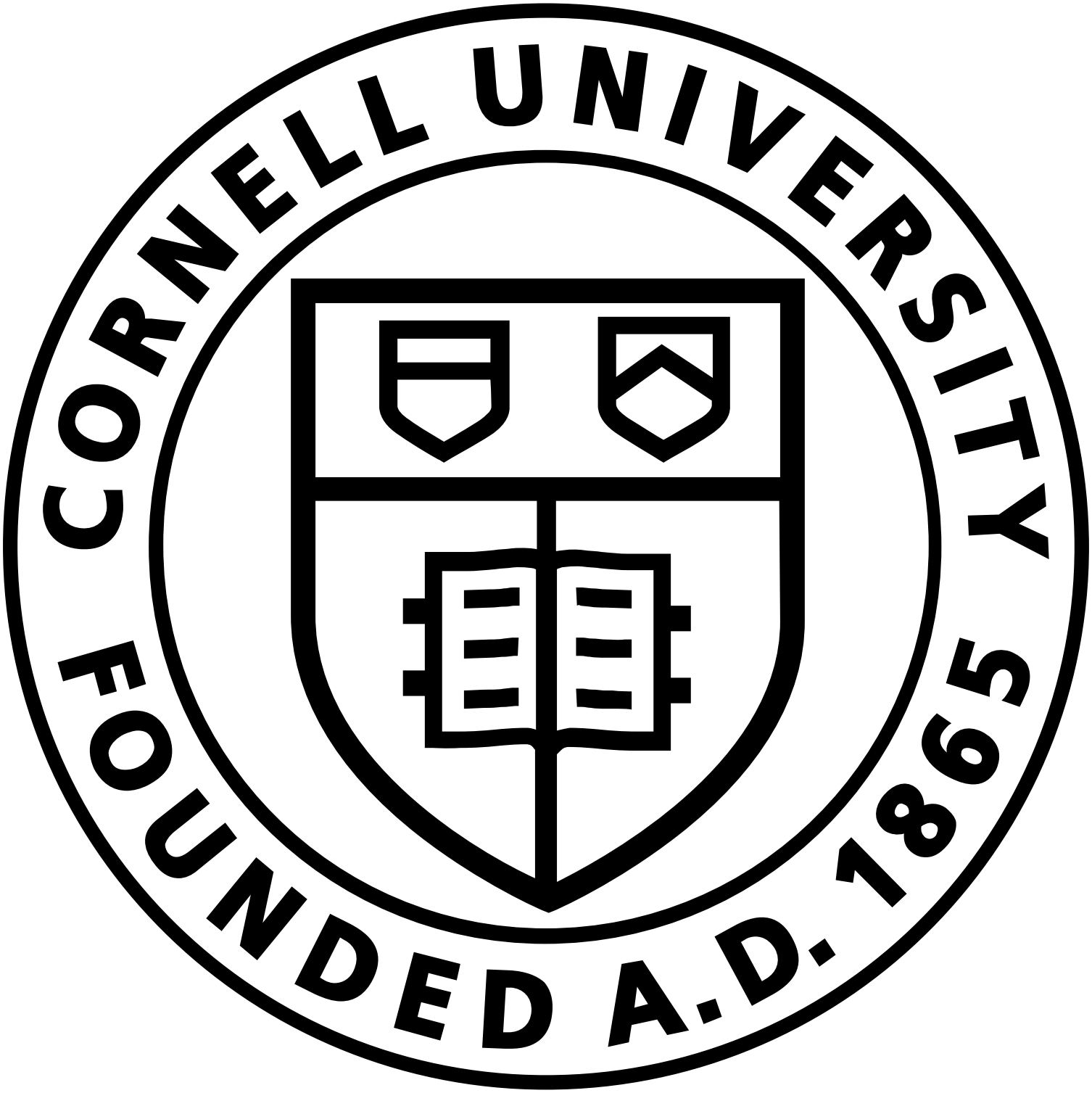
CORNELL UNIVERSITY
FOUNDED A.D. 1865

arXiv:1501.00492 (astro-ph)

[Submitted on 2 Jan 2015 (v1), last revised 6 Jan 2015 (this version, v2)]

HOPS 383: An Outbursting Class 0 Protostar in Orion

Emily J. Safron, William J. Fischer, S. Thomas Megeath, Elise Furlan, Amelia M. Stutz, Thomas Stanke, Nicolas Billot, Luisa M. Rebull, John J. Tobin, Babar Ali, Lori E. Allen, Joseph Booker, Dan M. Watson, T. L. Wilson

We report the dramatic mid-infrared brightening between 2004 and 2006 of HOPS 383, a deeply embedded protostar adjacent to NGC 1977 in Orion. By 2008, the source became a factor of 35 brighter at 24 microns with a brightness increase also apparent at 4.5 microns. The outburst is also detected in the submillimeter by comparing APEX/SABOCA to SCUBA data, and a scattered-light nebula appeared in NEWFIRM K_s imaging. The post-outburst spectral energy distribution indicates a Class 0 source with a dense envelope and a luminosity between 6 and 14 L_sun. Post-outburst time-series mid- and far-infrared photometry shows no long-term fading and variability at the 18% level between 2009 and 2012. HOPS 383 is the first outbursting Class 0 object discovered, pointing to the importance of episodic accretion at early stages in the star formation process. Its dramatic rise and lack of fading over a six-year period hint that it may be similar to FU Ori outbursts, although the luminosity appears to be significantly smaller than the canonical luminosities of such objects.

Comments: Accepted by ApJ Letters, 6 pages, 4 figures; v2 has an updated email address for the lead author
Subjects: **Solar and Stellar Astrophysics (astro-ph.SR)**
DOI: 10.1088/2041-8205/800/1/L5
Cite as: **arXiv:1501.00492 [astro-ph.SR]**
(or **arXiv:1501.00492v2 [astro-ph.SR]** for this version)

Submission history

From: William Fischer [view email]
[v1] Fri, 2 Jan 2015 21:00:05 UTC (7,202 KB)
[v2] Tue, 6 Jan 2015 01:51:37 UTC (7,202 KB)
◉ Bibliographic Tools

Bibliographic and Citation Tools

☐ Bibliographic Explorer Toggle
Bibliographic Explorer *(What is the Explorer?)*
☐ Litmaps Toggle
Litmaps *(What is Litmaps?)*
☐ scite.ai Toggle
scite Smart Citations *(What are Smart Citations?)*

○ Code & Data

Code and Data Associated with this Article

☐ arXiv Links to Code Toggle
arXiv Links to Code & Data *(What is Links to Code & Data?)*

This paper has not been found in the Papers with Code database. If you are one of the registered authors of this paper, you can link your code and data on your arxiv user page

○ Related Papers

Recommenders and Search Tools

☐ Connected Papers Toggle
Connected Papers *(What is Connected Papers?)*
☐ Core recommender toggle
CORE Recommender *(What is CORE?)*

○ About arXivLabs

arXivLabs: experimental projects with community collaborators

arXivLabs is a framework that allows collaborators to develop and share new arXiv features directly on our website.

Both individuals and organizations that work with arXivLabs have embraced and accepted our values of openness, community, excellence, and user data privacy. arXiv is committed to these values and only works with partners that adhere to them.

Have an idea for a project that will add value for arXiv's community? **Learn more about arXivLabs** and **how to get involved**.