

How Mesoscopic Superconductivity is Changing Astronomical Observation

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Title: How mesoscopic superconductivity is changing astronomical observation

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ABSTRACT:

Superconductivity is a very rich and intriguing phenomenon, which continues to pose challenging questions in condensed matter physics. Although it is over 100 years old its range of applications is limited. The most well-known are the superconducting wires, which are used for powerful cooled magnets for science experiments and MRI. Another branch is formed by superconducting electronics of which quantum computation is currently a very promising research-area, and which relies heavily on nanotechnology. A less widely known application with high impact is in astronomical instruments. I will discuss how superconductivity has served astrochemistry through the Herschel Space Telescope, and continue to do through the Atacama Large Millimeter Array. In addition I will discuss how superconducting resonators are evolving towards a multi-pixel camera in the THz range and to an on-chip spectrometer, both for astronomical observations.