

**Space Science Seminar
Tuesday, 2014 August 5
10:30 a.m.
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The Search for Solar Axions

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The recent discovery of the Higgs boson confirms the Standard Model, the comprehensive theory that explains the properties (e.g., the mass and couplings) of all known particles. At the same time, there is increasing evidence of physics beyond the Standard Model, including the existence of Dark Matter. Evidence for Dark Matter is supported by astrophysical and cosmological observations and well-developed theoretical frameworks. The two leading candidates for Dark Matter are weakly interactive massive particles (WIMPs) and axions. In this seminar, I will discuss on-going and planned searches for axions that may be emitted by our Sun. I will start by reviewing the theoretical motivation for the axion and describe its basic characteristics. I will then explain the concept of the axion helioscope, a technique used to look for Solar axions. Currently, the most advanced helioscope is the CERN Axion Solar Telescope (CAST), a project that has been collecting data for more than a decade. I will present results from CAST and show how X-ray optics are being used to increase the sensitivity of helioscopes. I will conclude by describing the International Axion Observatory (IAXO), a concept for a new experimental helioscope facility that would dramatically improve our ability to test the axion hypothesis.

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