

Abstract Submitted  
for the DAMOP18 Meeting of  
The American Physical Society

**A single-beam, potassium SERF magnetometer for the Global Network of Optical Magnetometers to search for Exotic physics (GNOME)**<sup>1</sup> SUNYOOL PARK, PERRIN SEGURA, SERAPHINA NIX, JASON STALNAKER, Oberlin Coll — Ultralight axion-like particles are a possible candidate for dark matter. These particles can result in topological defects that can be detected through their coupling with the spins of elementary particles. This coupling results in a pseudo-magnetic interaction. The Global Network of Optical Magnetometers to search for Exotic physics (GNOME) searches for transient signals caused by the Earth going through these topological defects using several magnetometers located throughout the world to differentiate true signals from false positives. At Oberlin College, we are developing a single-beam spin exchange relaxation-free (SERF) magnetometer using potassium atoms with a helium buffer gas. We monitor the absorption of circular polarized light going through the vapor cell housed within four layered magnetic shields. The magnetic field dependence of the absorption is used to measure the magnetic field. We also discuss future plans to construct a Rb-K-<sup>3</sup>He SERF comagnetometer to achieve better sensitivity.

<sup>1</sup>This work is supported by the US National Science Foundation (PHY-1707803).

Sunyool Park  
Oberlin Coll

Date submitted: 25 Jan 2018

Electronic form version 1.4