

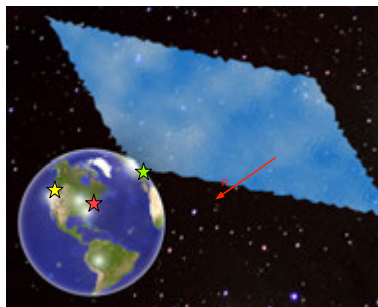
Exotic Axion Search

• GNOME

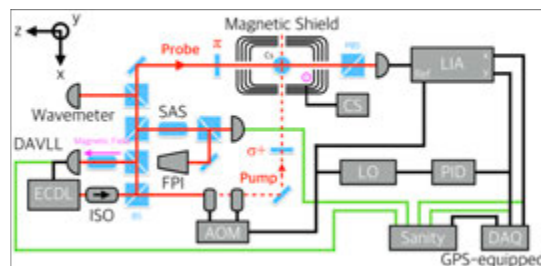
- **Global Network of Optical Magnetometers for Exotic physics**
- Scalar field potential gradient induced by **domain walls** and **axion stars**

$$H_a = \frac{\hbar}{c} \vec{s} \cdot \nabla a(\vec{r})$$

- IBS/CAPP is one of the networks (15 stations) over the globe
- CAPP contributing to
 - **High sensitivity magnetometer**
 - 40 fT/√Hz, Bandwidth: 10 Hz
 - **Multi-station data analysis tool**
 - Signals from synchronized multiple time window datasets



IBS/CAPP Magnetometer setup



• ARIADNE

- **Axion Resonant InterAction Detection Experiment**
- Axion as a **force mediator** between nucleons

$$U_{sp}(r) = \frac{\hbar^2 g_s g_p}{8\pi m_f} \left(\frac{1}{\lambda_a r} + \frac{1}{r^2} \right) e^{-\frac{r}{\lambda_a}} (\hat{\sigma} \cdot \hat{r}) \equiv \mu \cdot B_{eff}$$
- Probing wide range QCD axion
 - Independent of cosmological assumptions
- Development at CAPP
 - **Large ^3He polarization system**
 - **SQUID gradiometers w/ KRISS**
 - **SC magnetic shielding w/ high Tc on Quartz substrate**

