Search for Axion Domain Walls using the Global Network of Optical Magnetometers for Exotic physics searches (GNOME)

Hector Masia Roig and Joseph Smiga for the GNOME collaboration
The Global Network of Optical Magnetometers for Exotic physics

Oberlin, Canberra, Belgrade, Jena, Stuttgart, Los Angeles

Currently, 15 Stations

1. Beijing, China
2. Berkeley, USA
3. Daejeon, South Korea
4. Fribourg, Switzerland
5. Hayward, USA
6. Hefei, China
7. Krakow, Poland
8. Lewisburg, USA
9. Mainz, Germany

S. Afach et. al., Physics of the Dark Universe, 22, 2018, 162-180
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ALP Domain-Wall signature


Network time-series

Domain Wall
- Magnitude
- Velocity
- p–value

H. Masia-Roig, J. A. Smiga et. al., Physics of the Dark Universe, 28, 10049, 2020
Data analysis

No significant signal found

One month measurement
ALP constraints

- Symmetry breaking scale
- Coupling constant
- Mass

Very specific model
- Complementary constraints
- GNOME is searching for Dark matter!

S. Afach et. al., 2021, 2102.13379, arXiv
Thanks for your attention

https://budker.uni-mainz.de/gnome/