

Search for eEDM in cryogenic crystals

PHYDES: Para-Hydrogen and Diatomic for eEDM Study

Electron electric dipole moment (eEDM) d_e is an asymmetric charge distribution along the particle spin direction. In the Standard Model $d_e < 10^{-30}$ e·cm, but many extensions predict new contribution to EDM making this search an ideal probe for detecting new physics associated with CP violation.



PHYDES is an R&D project funded by INFN V committee. The idea is to use diatomic polar molecules where e-EDM effects are amplified because of the large internal molecular effective field and to embed such molecules in solid cryogenic matrices. Applying a polarizing electric field to the matrix, molecular magnetization related to eEDM becomes oriented and generates ultra-weak magnetic field that can be measured placing constraints on eEDM.

The key aspects are:

- find a molecule with large effective field;
- choice the best host element;
- work at low temperature;
- maximize the density n .

