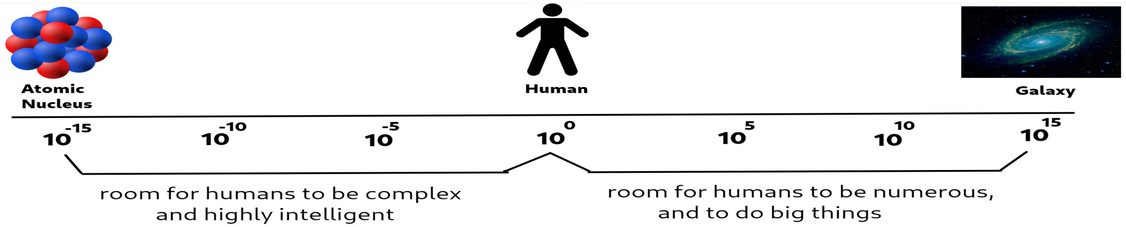
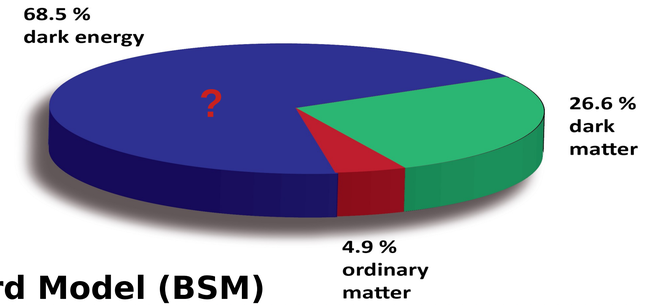
Jefferson Eta Factory Experiment in Hall D

Challenges in Physics:





Confinement QCD

- Why there is no free quarks exist in nature?
- Where does the mass of visible matter come from?

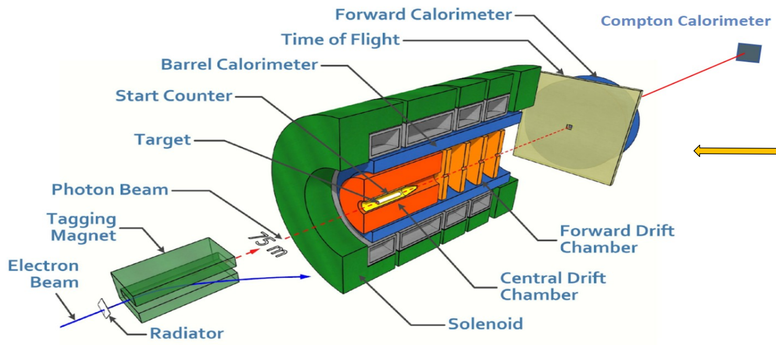
New physics Beyond the Standard Model (BSM)

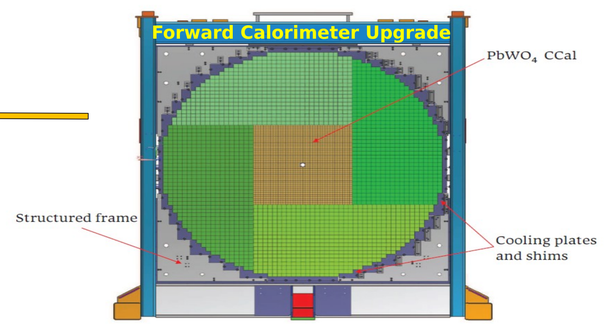
- Are there new sources of CP violation explaining the observed asymmetry of matter and antimatter in Universe?
- What is the nature of dark matter?

η and η' decays provide sensitive probes to explore both confinement QCD and new BSM physics.

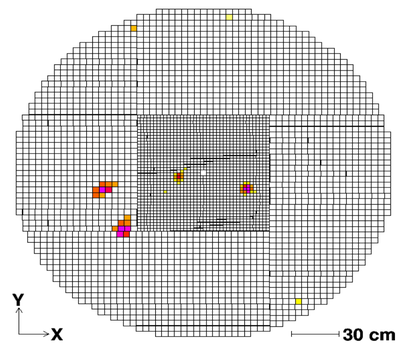
JLab Eta Factory (JEF) Experiment:

- The JEF experiment will measure varies η/η’ decays which emphasis on rare neutral mode.
- **Uniqueness of JEF Experiment:** Compare with all other η/η’ experiments in the world, the JEF experiment has of two-orders of magnitude background suppression in the rare neutral decay mode of η /η’.





FCAL II Reconstruction



Main JEF Physics Objectives:

- Search for sub-GeV hidden bosons.
- Directly constrain C-violating and P-conserving new Physics.
- Precision tests of low-energy QCD.
- Determination of quark mass ratio.

Jefferson Lab

DEPARTMENT: PHYSICS

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