



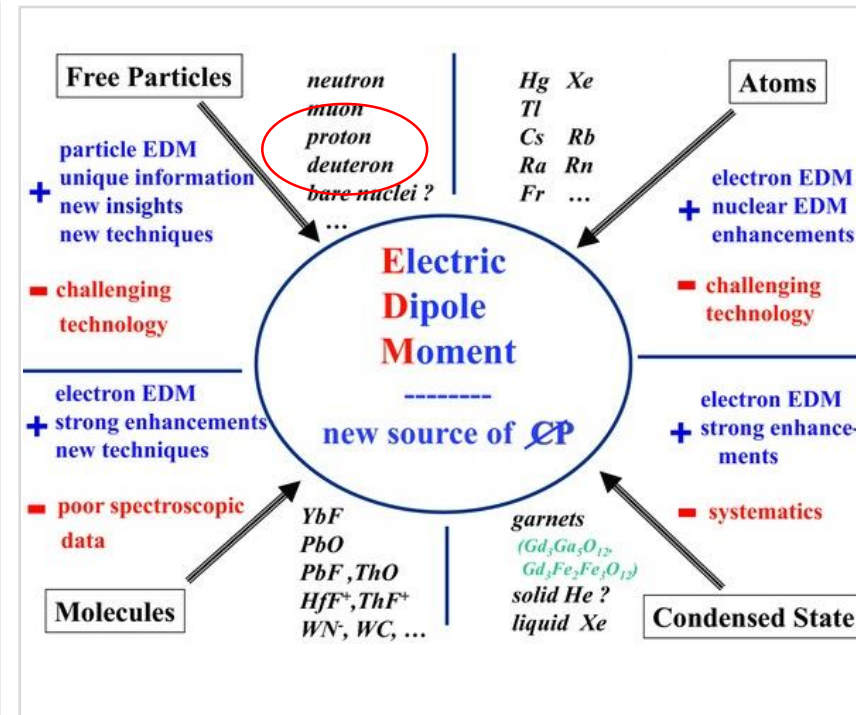
**CP EDM MEETING**  
**INTRODUCTION**

MARCH 8, 2018 | HANS STRÖHER (FORSCHUNGSZENTRUM JÜLICH)

## Why EDM measurements

### Statements by Frank Wilczek (2014):

- Measurements of electric dipole moments are a **unique, extraordinarily sensitive way to probe** for a physical phenomenon of profound significance, **violation of microscopic time-reversal invariance.**
- They currently **put the best limits on the  $\theta$  parameter**, and offer the **most plausible means to determine that fundamental parameter.**
- They also **constrain many implementations of supersymmetry**, a much-anticipated extension of the Standard Model, that supports quantitative unification of the basic forces of Nature.
- If **supersymmetry is valid**, it very plausibly leads to electric dipole moments not far beyond present-day limits, and **within the scope of known experimental technique.**



## Motivation

### Program of the CPEDM-Meeting March 8 & 9, 2018 in Jülich

#### Introduction – Overview – Status (brief reports)

Welcome	<b>Ströher</b>	Schedule, logistics, COSY/IKP future, etc.
CERN View	<b>Lamont</b>	What does CERN want/need from this process? Process status, schedule, deadlines, goals Manuscript preparation CERN tasks, site layout, etc. Outside funding initiatives (synergy grant?)
KAIST View	<b>Semertzidis</b>	Projects, database, systematics overview
COSY View	<b>Pretz</b>	Recent progress, beams and orbits, precursor Prototype concept

#### Recent Status

Magnetic shielding	<b>Haciomeroglu</b>	Beam line mockup with shielding, etc.
Polarimetry	<b>Stephenson</b>	LYSO and GEM detector testing, installation at ANKE Database results, etc.
Deflectors	<b>Grigoriev, Stahl</b>	Status, ideas
Beam and orbit control	<b>Lorentz</b>	Experience at COSY

#### Low Energy Prototype Electric Ring

Introduction	<b>Martin</b>	Motivation, what do we gain or risk? Lattice, siting, features, costs
Low-E Polarimeter	<b>Stephenson</b>	Polarimetry near 45 MeV proton energy (brief)
Discussion	<b>Ströher</b>	Should this project be a part of our path forward? If yes, should we also pursue a magnetic field upgrade? How hard should we work to produce a high quality ring?

#### The Ultimate Ring, Design and Systematics

Prototype concept	<b>Martin</b>	Lattice, parameters, vertical tune capability
Spin tracking	<b>Haciomeroglu</b>	Quad misalignment systematics
Spin tracking	<b>Gaisser</b>	Program comparisons, numerical verification
Limiting sensitivity	<b>Carli</b>	Can we reach the desired sensitivity? What are the issues?
Systematic errors	<b>Semertzidis</b>	Quantifying systematic limitations to sensitivity Review of the Lebedev results Issues raised by CW/CCW comparisons

#### The Ultimate Ring, Practical Matters

CERN landscape	<b>Lamont</b>	Siting issues, polarized source, linac choices, etc.
Beam transport	<b>Stephenson</b>	Source to ring, spin handling issues
Polarized source	<b>Gebel</b>	What source do we want, what does it cost, who gets it?
Components	???	Major hardware, shielding, vacuum, etc.
SQUIDS	<b>Matlashov</b>	Status, experience
Discussion	<b>All</b>	Are we meeting the CERN challenge? What are the main weak points to improve? How do we organize our activities? What's next?

#### Things not yet on the list

Axion search	<b>Semertzidis</b>	COSY proposal and beyond
Frequency domain	<b>Senichev</b>	





## Schedule, dates

March 26	PBC Theory Workshop (CERN)
June 13/14	PBC General Workshop (CERN)
Oct. 1/2	JEDI CM (Cracow)
Dec.18	Deadline EPPSU

Dinner tonight



Jülich, Große Rurstraße 34

→ Who will join?