



Probing Composite Higgs with Gravitational Waves

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Based on:

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with A. Banerjee and M. Merchand

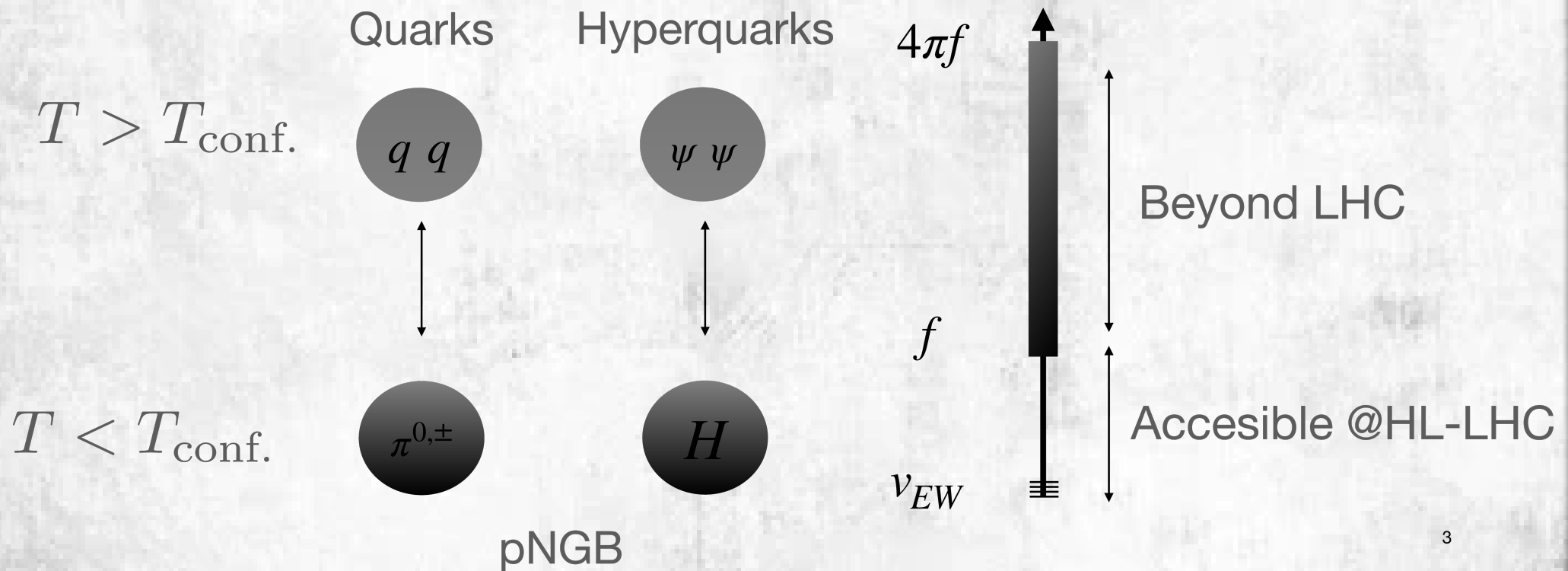
**Particle Astrophysics
in Poland**

21/02/2025, Warsaw

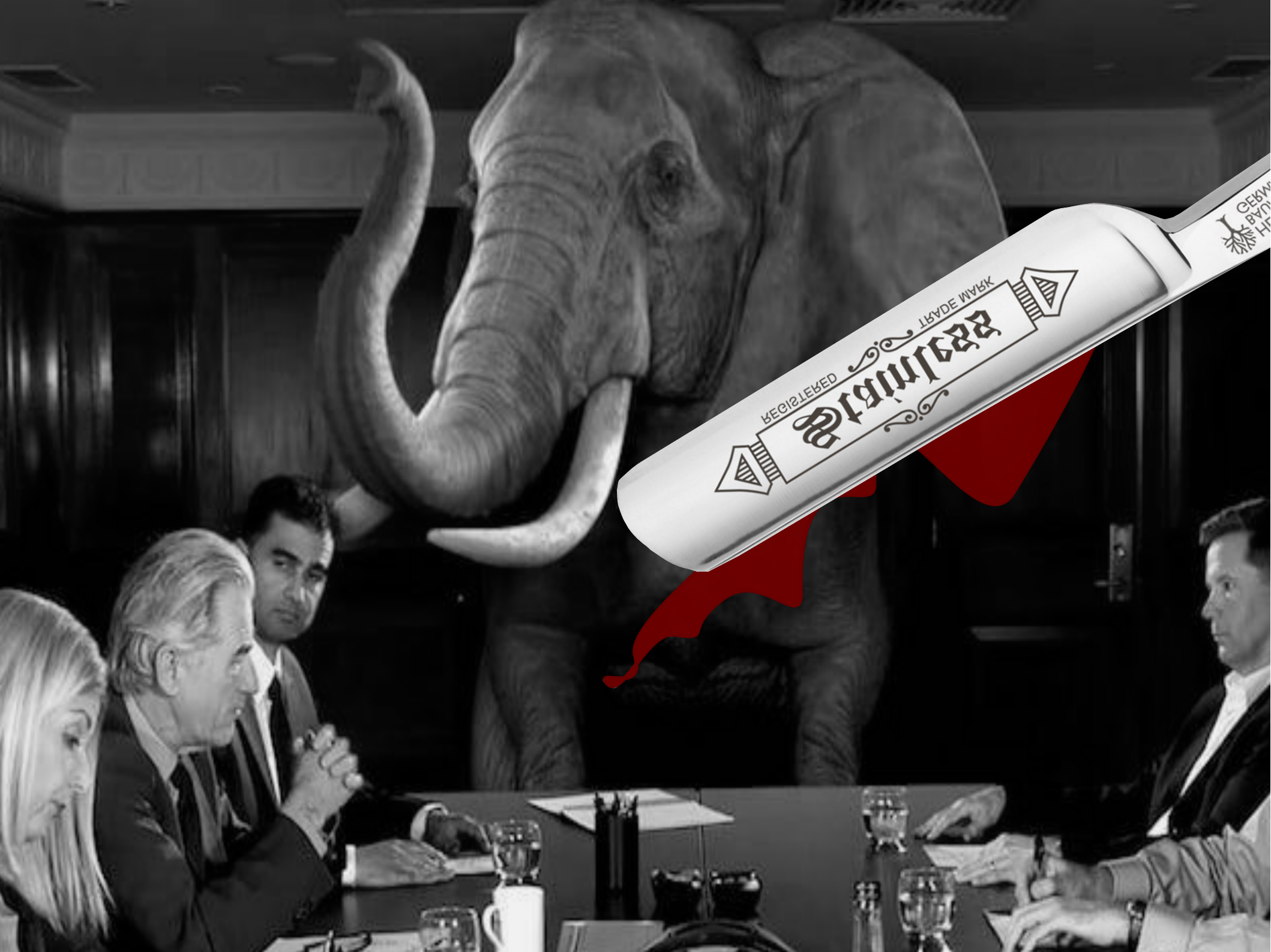
Is the Higgs boson truly Fundamental?

We don't know!

It might be composite...

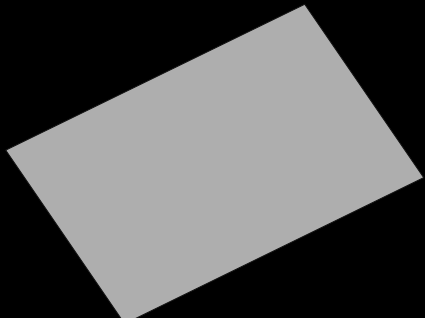






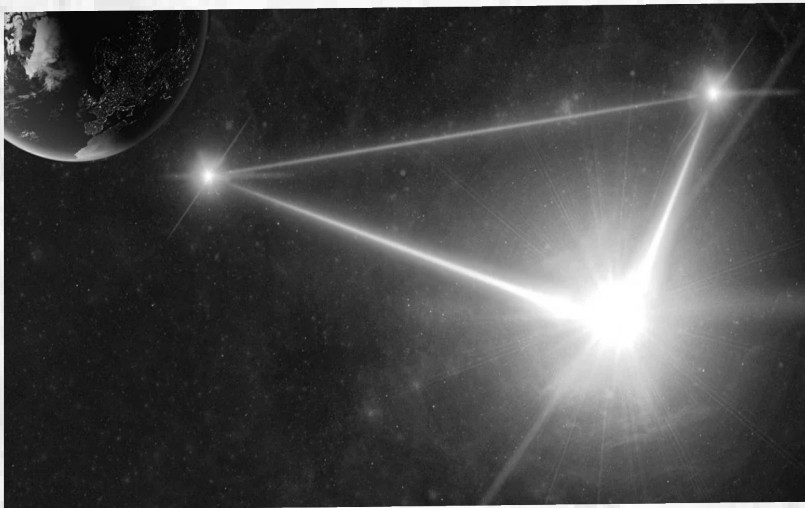


Left to right: Moon, Saturn, Titan, Iapetus, and several other moons of Saturn.



Motivation?

- EW Hierarchy problem
- Baryon asymmetry
 - First order phase transition
 - CP-violation



Verifiability?

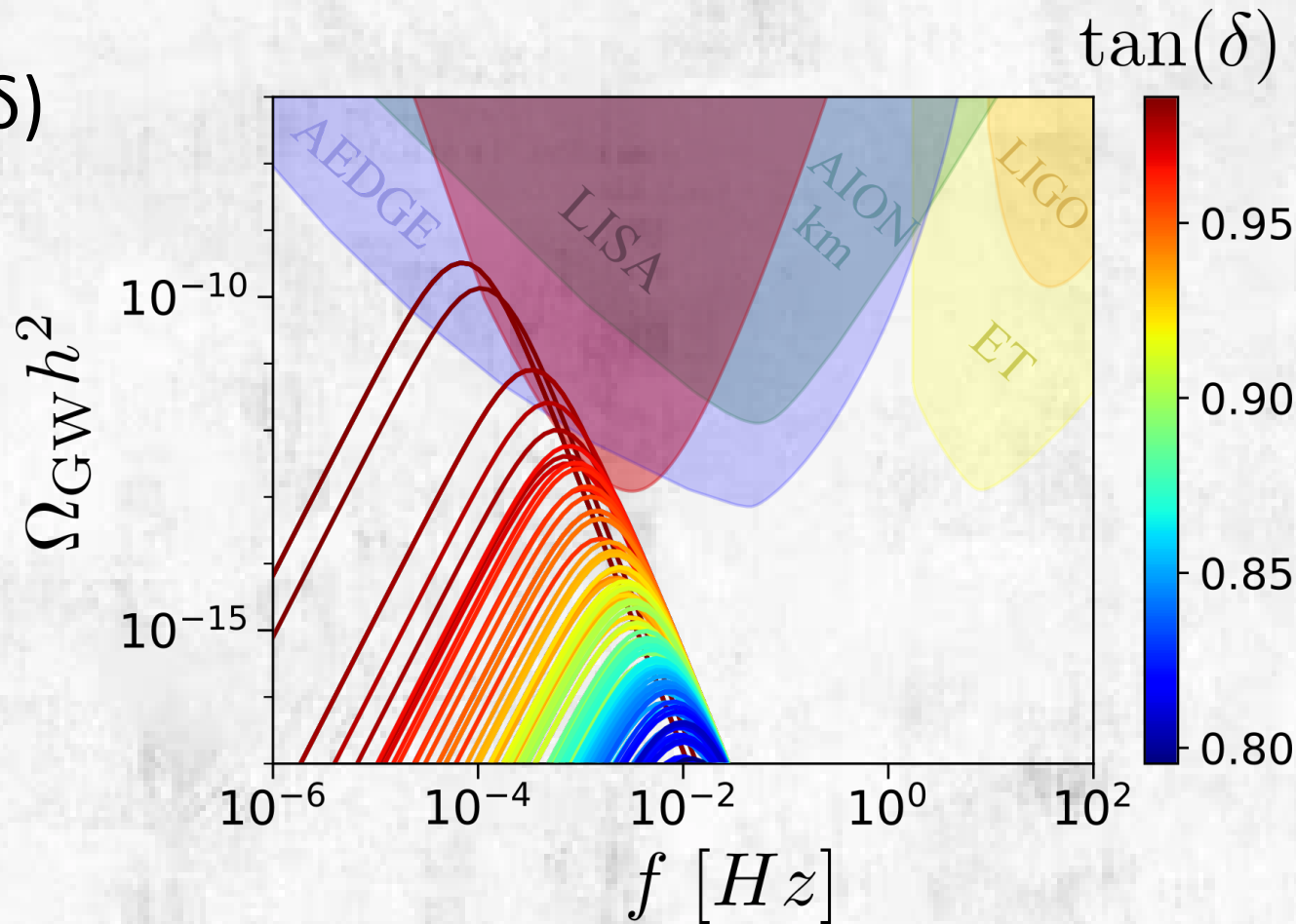
- Can be probed by gravitational wave (GW) detectors
- Will be tested with HL-LHC



Phenomenology

Stochastic gravitational waves signal

- Larger values of $\tan(\delta)$ lead to stronger GW signal.
- Observation of GW background would inform us about the amount of CP violation in the model



GW detection would tightly constraint Hyperquark phase!

Conclusions

- 1) Standard Model Higgs could be composed of confined fermions.
- 2) Composite Higgs scenarios:
 - explain the hierarchy of Higgs mass,
 - will be probed by HL-LHC.
- 3) Detectable GW signal is expected only in the region of the model parameter space with high CP violation.