# EDM in g2HDM thesis outline

## Introduction

- Motivation
    - Unanswered questions in HEP
    - Limitations of the current leading model (SM)
    - What extra good does g2HDM bring?
    - EDM as a precision probe of NP

## The theoretical framework

### A review of the Standard Model of particle physics

- Field-theoretic framework
- An overview of SM group structure, particles, and interactions

### g2HDM

- g2HDM as a natural extension of the SM
    - What differentiates it from other (similar) models?
- The Lagrangian and Yukawa structure
- How various parameters in the theory can contribute to NP

### EDM

- EDM theory in the context of particle physics
- The Lagrangian and model-independent approach (Wilson coefficients?)
- Current status of EDM experiments

## My analyses

### Lepton EDM

- How g2HDM contributes to lepton-EDM
    - One-loop
    - Two-loop Barr-Zee
- Results
    - For "double-checking" my calculations are valid (and for completeness), reference key results and plots of Prof. Hou 2020 paper
    - c.f. our 2022 JHEP paper for $\mu$ and $\tau$
    - muon
        - One-loop does not produce sizeable contribution to EDM, but is a driving factor for g-2. Mention plot in paper? Girish made the g-2 plot, I don't have

code written for that (yet)
        - Two-loop still at least three orders of magnitude below experimental bound. Plot $|d_\mu| v.s. |\rho_{tt}|$
    - Tau
        - Not even remotely close to experimental bounds. Plot $|d_\tau| v.s. |\rho_{tt}|$
- Summary of the results
    - Both muon and tau are currently "out of reach" by a long shot

### Quark EDM

- How g2HDM contributes to lepton-EDM
    - One-loop
    - Two-loop Barr-Zee
    - Weinberg
- Results
    - c.f. current CEDM project paper
- Summary and analysis of the results

## Conclusion and discussion

- Summary of motivation
- Summary of theoretical framework
- Summary of the analyses
- Future prospects