- Nominal Parameter Setting:

a) Total Number of Layers: 40 (30~60)

b) Glass Cell Size: 40×40×10 mm^3 (Transverse size 10~60 mm; Thickness 5~15 mm)
To further determine whether to use 40mm or 20mm as the nominal value…

c) Total Nuclear Interaction Length: 6 λ (4~7 λ)

d) Glass Density: 6 g/cm^3 (3~8 g/cm^3)

e) Readout Time Window: 1us (0.5~2 us)

f) Light Output: 100 p.e./MeV (20~200 p.e./MeV)

g) Readout Threshold: 0.1 MIP

- Action items

(1) Evaluate and determine a set of nominal parameters (full simulation)
  a) Parameter scanning of (a) ~ (e) based on their nominal value and range
    i. BMR
    ii. Single particle
      1. HCAL only
      2. ECAL + HCAL
      3. ECAL + HCAL + upstream material
  b) Cost estimation: material (volume) + readout (#channels)

(2) Fast simulation
  a) Neutral hadron reconstruction efficiency
    i. Confirm whether the energy is the total energy or kinematic
    ii. Multiplicity statistics
  b) Charged hadron PID efficiency ~80%
  c) Time threshold, light yield smearing, etc
  d) Comparison of different configurations
    i. GSHCAL vs AHCAL, Crystal ECAL vs Si-W ECAL
    ii. Need dedicated full simulation inputs (intrinsic resolution, thresholds, PFA confusions, etc)

(3) Digitization
  a) A validated digitization method
  b) Light yield
  c) The non-uniformity of the glass cell and position response in each cell

(4) Consider the impact of the glass composition (Li/Gd-content ratio) on the neutron

response and final PFA performance

(5) Varying glass cell size for the longitudinal setup (bigger cell size in the tail of the GSHCAL to reduce the cost)

(6) Consider the possibility to reuse the steel absorber as a part of the yoke

- Try to make all comparisons as fair as possible
  - Choose AHCAL as a benchmark (expected comparable contribution from PFA confusion)
  - The (fitting) method to extract the BMR
    - Straightforward comparison at raw mass distribution level is necessary