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Future studies

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Stage I

- Further design effort on the octupole scheme to obtain uniform distribution
- Optimization and full integration of the optics for mini-beams
  - The first scheme was established and no short stopper was found
  - Painting simulation
- Error study
- More definitions on the diagnostic and control systems

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Stage II

- Further studies on the injection line
  - Is it the final scheme?
  - Detailed positions of elements vs closed orbit and magnet boundaries
  - Space charge simulation
- Implement messages and implications from FETS-FFA magnet prototype measurements on LhARA-FFA magnet
- Further detailed DA studies in the LhARA-FFA
- Error study
- Longitudinal dynamics simulations
  - Including the effect of the tilted RF gap
  - Simulations of the bunch manipulations

Stage II, slide 2

- Full design of the RF cavity
  - It seems MA loaded RF cavity is preferred
- Full design of the diagnostic system
  - We can use the experience gained at KURNS and during FETS-FFA study
- Design of the kickers and septa
- Definition of the control system
- Space charge simulation at injection and debunching in LhARA-FFA
- Updated optics for HEBT
- Optics for the high energy in-vitro end-station
  - Effort very similar to Stage 1
- Optics for in-vivo end-station
  - Including mini-beams
  - Painting simulation
- Diagnostic and control system for HEBT, in-vitro and in-vivo beamlines

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Summary

- We have achieved remarkable results with small resource provided
  - See the CDR
- However, a significant effort is required to achieve the TDR level of advancement
  - With the current resources it will be very difficult, if not impossible
    - At the moment we do not have an expertise in several key areas, for example in RF engineering, septum design or diagnostics
- I certainly have forgotten about something…