RIR radiation physics criteria
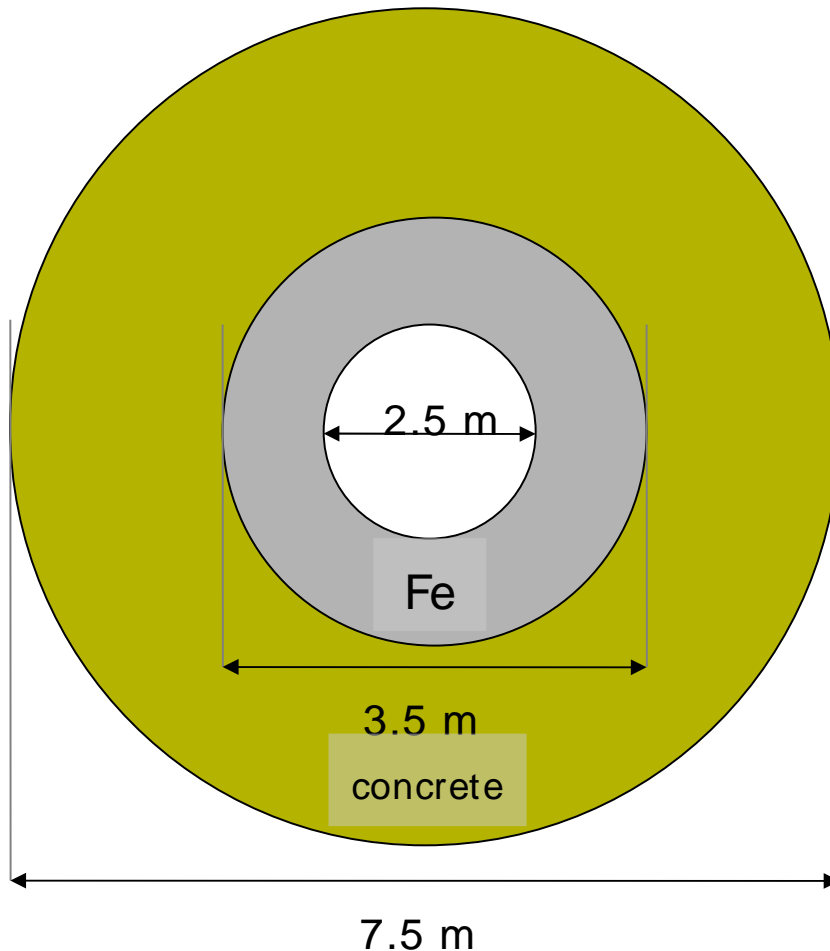## discussion session

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September 18, 2007
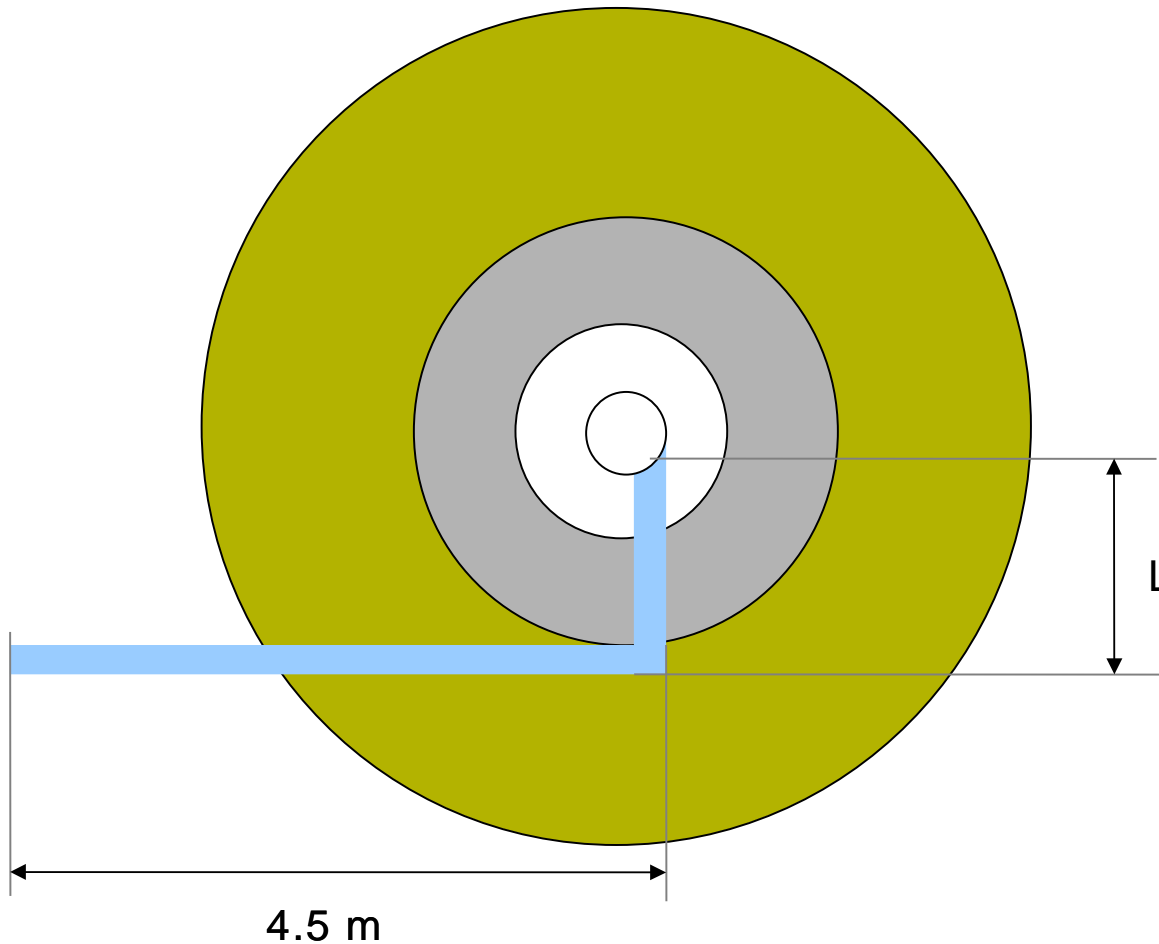
CONSIDERATIONS:

- Preliminary calculation. No joints, etc. considered in simple model.

- Huge shielding ==> big attenuation ==> need acute biasing techniques
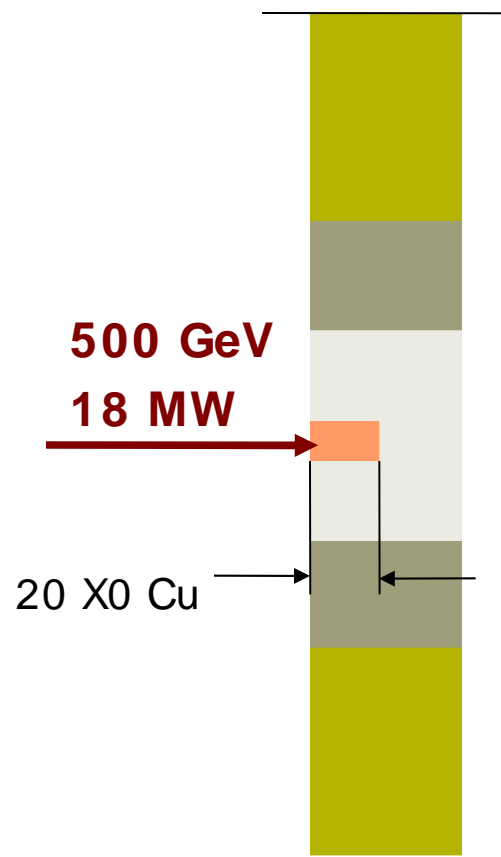
2.5 m

Fe

3.5 m
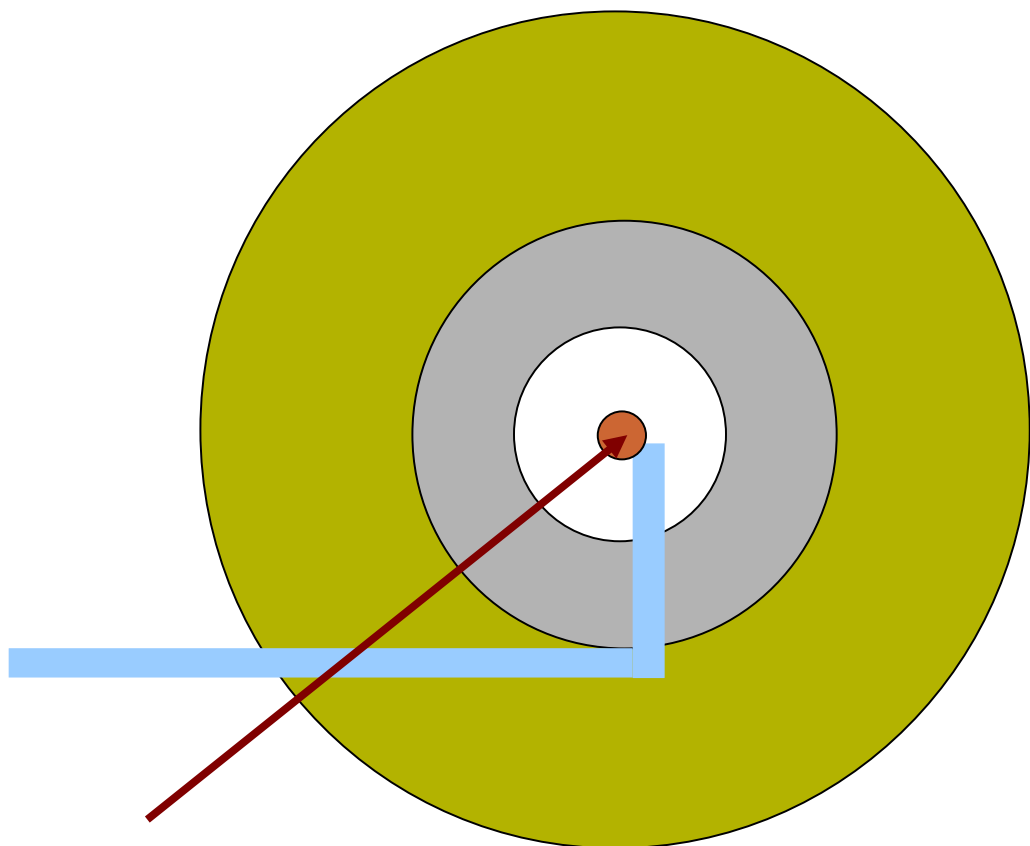
concrete

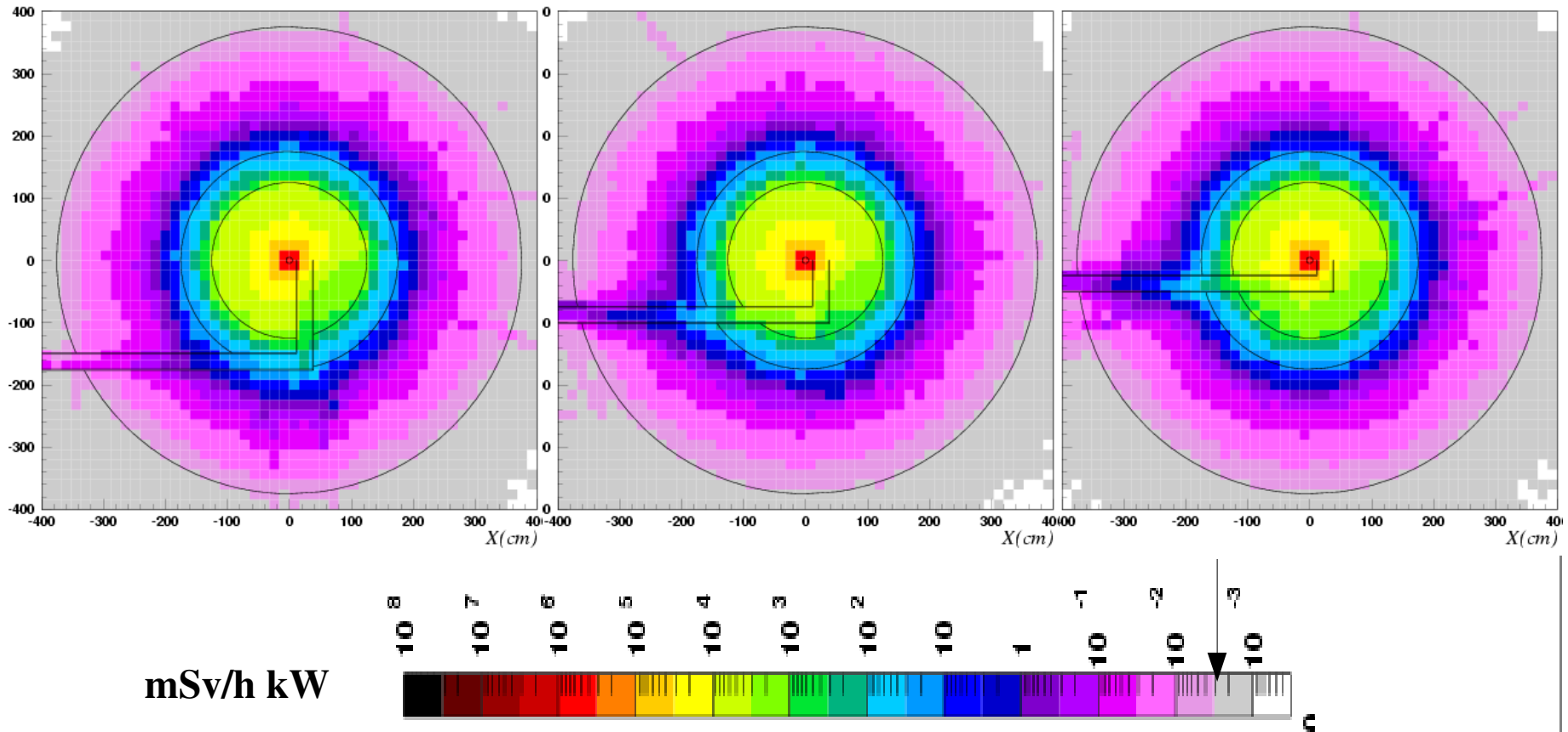7.5 m

GOALS:

- Dose outside shielding

- Importance of the design of the penetrations: L.

L

4.5 m

500 GeV

18 MW

20 X0 Cu

mSv/h kW

- Average dose around perimeter < 3 mSv / h MW
  - Longer elbow--> more balanced peak dose

Radiation Physics status overview

- KEK and SLAC-RP to be involved in ILC IR radiation protection studies

- Dose limits and regulations site-dependent

- Simulations to be carried out with state of the art multi-particle transport codes: MARS15+MCNP and FLUKA

- Calculations already performed for the four detectors in their present configuration

- Studies ongoing for Pacman shielding

Discussion

- Model for radiation safety design
  - → To kick off fundamental studies
    - Beam loss estimation in IR hall
      - Beam-Beam, Beam-Gas interaction
      - Location of collimator and its effect
      - → To figure out normal beam loss distribution
    - Detail structure of devices around beam line
      - Material, thickness, dimensions, gaps
      - →real material instead of pessimistic target
- → Move forward to find solution of radiation shielding

Parameters

- **Detector**
  - Dimension and material, especially muon system, hadron and EM cal., Lumi. Cal, Beam Cal., Gaps

- **Pacman**
  - Inner diameter: 1.6m
  - Penetration: 25cm diam pipe for Cryo connection
  - Cryostat, Beam diagnostic devices, Vacuum isolation valves
  - How to divide for push-pull

- **BDS tunnel**
  - Inner diameter: 4m (height: 3m)
  - Offset to Pacman