Mass production APR20

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Open questions

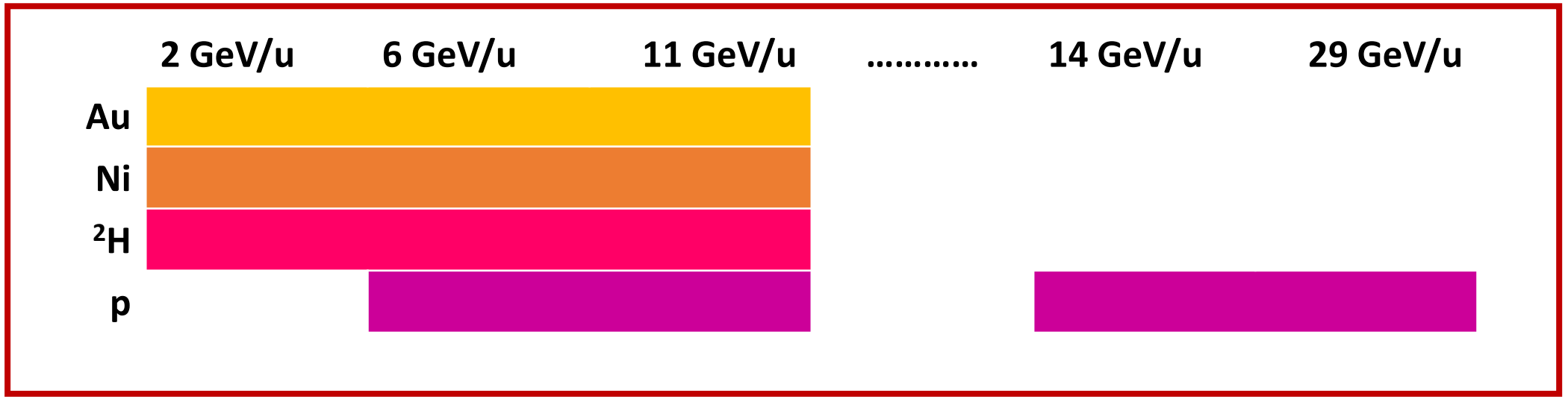
- Beam
  - energy
  - beam particle (ions, proton)
- Magnetic field scaling

SIS100 possibilities for CBM Slow extraction

FAIR Operation Modes. Reference Modes for the Modularized Start Version (MSV).

- ion beams (Sabrina Appel and Oliver Boine-Frankenheim)
  - 2-11 GeV/u
    - for low beam energies at SIS100, below 4GeV/u, the beam emittance will be worse than requested
    - low extraction is not available near gamma transition, banned energy is 11-14 GeV/u
- p beam (David Ondreka, HIC4FAIR Workshop No 2, 2016)
  - 6 ... 11 GeV/u and 14 ... 29 GeV/u appear to be safe
    - energies below 5 GeV/u will probably not work at all
    - difficulties expected around transition for 11 ... 14 GeV/u

Physics program versus beam properties



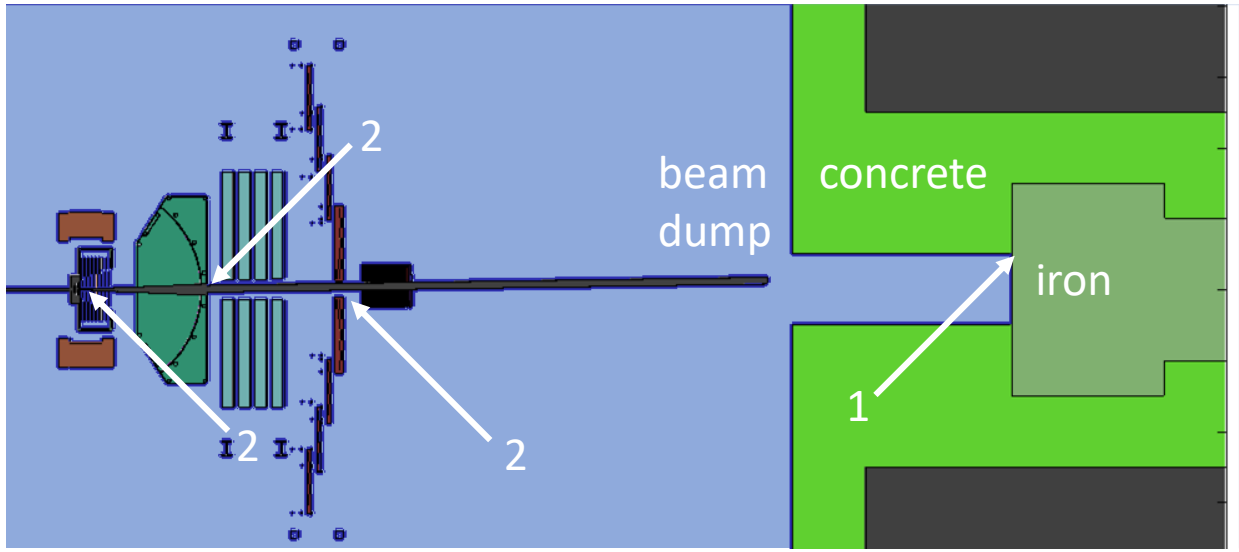
- LMVM
  - ion beam – 2-11 AGeV
  - p beam (?)
- J/ψ:
  - ion beam – 6*(?)-11 AGeV
  - p beam – 14(?)-29 GeV

PLUTO input

- LMVM
  - Au+Au: 2 or 4, 6, 11 AGeV
- J/ψ:
  - Au+Au – 11 AGeV
  - p+Au – 29 GeV

*J. Steinheimer, A. Botvina, M. Bleicher, arXiv:1605.03439v1

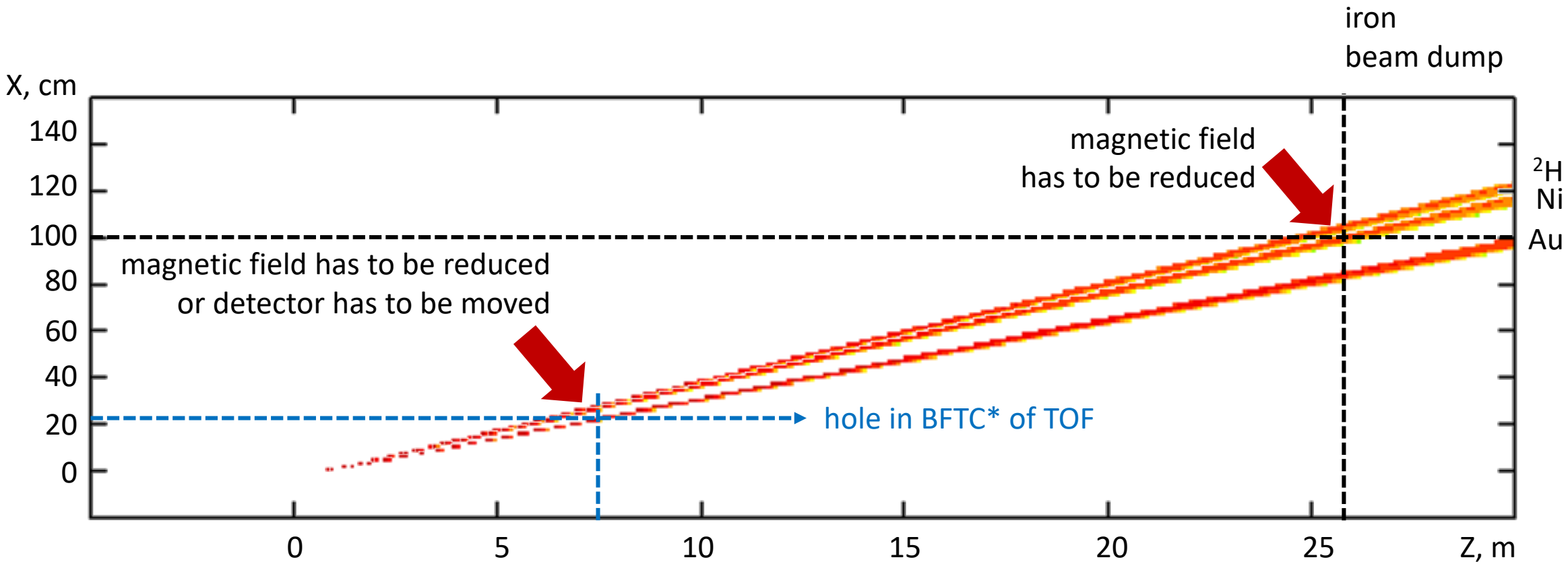
Magnetic field scaling study



- Magnetic field (MF) scaling:
  1. radiation point of view (to fit beam dump)
     - for Au beam: 2 A GeV – 60 % MF, higher energy – 100% MF
     - for lighter ion beams – has to be calculated
  2. detector geometry point of view (to fit unmoveable part of beam pipe, to fit inner hole in the detectors or move detectors according beam deflection)
     - cylindrical beam pipe R=2 cm in Z=20÷50 cm from target
     - conical beam pipe R=16.16 cm in Z=3.7 m from target
     - TOF – hole in BFTC* ±22 cm in X direction (Z≈7 m from target)
  3. physics point of view
     - PSD MF scaling in TDR

** Beam Fragmentation and T0 Counter*

Au@4 AGeV, 100% magnetic field



** Beam Fragmentation and T0 Counter*

Magnetic field scaling with unmoveable beam pipe

Magnetic field scaling (%)					
beam	2 A GeV	4 A GeV	6 A GeV	8 A GeV	11 A GeV
Au	**23**	**41**	**58**	**74**	**100**
Ni	**21**	**36**	**51**	**66**	**89**
^{2}H	**19**	**33**	**46**	**60**	**80**

if beam pipe position will be fixed for 8 AGeV Au beam by 100% MF,
than 11 AGeV Au beam will be outside of beam pipe

Simulation program

- Physics simulations
  - LMVM
    - Au+Au: 2 or 4, 6, 11 AGeV
  - J/ψ
    - Au+Au – 11 AGeV
    - p+Au – 29 GeV
- Technical simulations: magnetic field scaling study
  - scaling for low energy of Au beam
  - scaling for light ions:
    - to have the same acceptance as for Au beam with the same energy ?
    - to have maximal possible magnetic field ? (better STS track reconstruction and mass resolution)

we can use only one signal (ω ?) and low statistics for background (10^6 central events)