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Main activities, for the Round Table at the ICE meeting, 19/01/2011

Beta-Beam Production Ring studies:

- Task within EUROnu FP7 program, Work Package 4:
  - Aim: Reach the required Beta Beam intensity of 10^{14} ion/s at the source
  - How: Enhance the production by multi-passage through a thin internal target in a compact storage ring *[C.Rubbia et al., NIM A 568 (2006)]*. Stored beam cooled by ionization-cooling; radioactive products collected and sent to the ECR source.
  - Other participants:
    - CRC, Louvain La Neuve, Belgium: collection device
    - INFN Legnaro, INFN Napoli, Universita` di Padova, Italy: angular cross-section measurements for ^{6}Li(^{3}He,n)^{8}B and ^{7}Li(d,p)^{8}Li reactions
  - My responsibility: ring design, feasibility and ionization-cooling studies
- Design:
  - Preliminary lattice **ok** (M.Schaumann, Student Summer'09, Aachen U.)
    → **NEXT STEP**: needs optimization
- Ionization cooling and 6D tracking simulations:
  - SixTrack model successfully **benchmarked** w. MADX/PTC
  - 6D tracking with simple modeling of the target fully **in place**
    → **ONGOING**: give input/ benchmark for the Sixtrack+Fulka coupling effort by D.Sinuela, V.Vlachoudis, (EN/STI)
  - Ionization-cooling works in simulations **as expected** from analytical considerations.
- Feasibility studies:
  - Proposed D or ^{3}He gas-jet target of 10^{19}/cm^{2} thickness is very challenging in vacuum.
    → **Decision** to go for a liquid Lithium target & stored ^{3}He or D (direct kinematics).
    - Optimum energy/foil thickness studies (T.Weber, Student Fall'10, Aachen U.)
    - → **TO DO**: contact people in Argonne, R&D with liquid Li for ion stripping.
- FFAG option (contacts with Y.Mori and K.Okabe, KURRI, Japan)
  - Similar machine, internal target for neutron production, FFAG-ERIT prototype built
  - Invited to visit KURRI in Nov.'10
    - → **ONGOING**: Studies how to adapt ERIT to our Beta Beam needs
- **NEXT STEPS:**
  - New collaborator from Padova U. for i-cooling studies: meeting in Feb. to define plan
  - Lattice optimization & Feasibility ring with direct kinematics (again source, RF, vacuum, injection,…)

Next (in //): Beta Beam ions in the upgraded (LIU) injectors:

- It is of vital importance, for Beta Beam to become a realistic option for future nu-physics at CERN, to follow-up and evaluate how will the planned upgrade of LHC injectors affects/improves the beta-emitters acceleration in the PS (and SPS):
  - I'll start with PS, by revising what done for the present machine within FP6 Program.
  - Preliminary, informal discussion with S. Gilardoni (PS Upgrade Coordinator)