IRIDE – Il punto di vista della sezione INFN

R. Faccini, P. Valente

Status

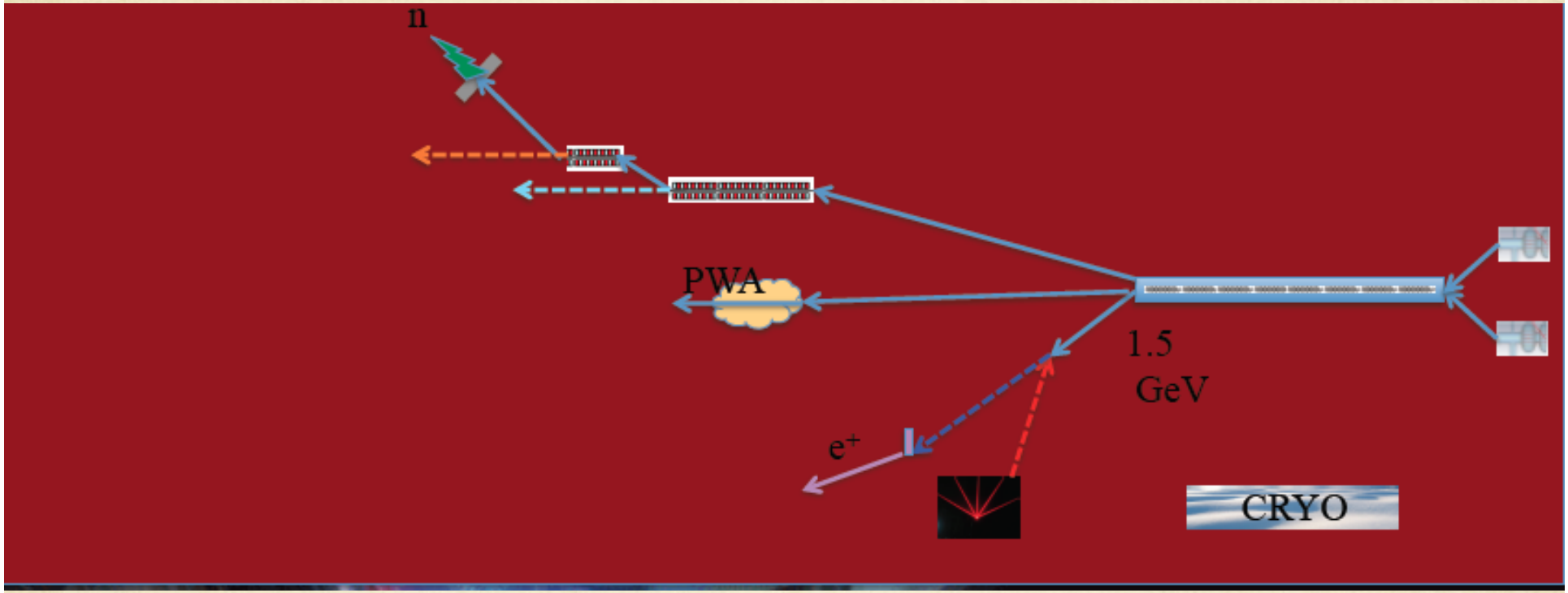
- Still ongoing brainstorming on flagship aspects of the project
  - Both in applied and fundamental physics
- Even more under discussion is the prioritization of the individual parts of the project

CONTRIBUTIONS NEEDED FROM THE COMMUNITY IN IDEAS, CALCULATIONS, SIMULATIONS, R&D ...

Summary of physics opportunities

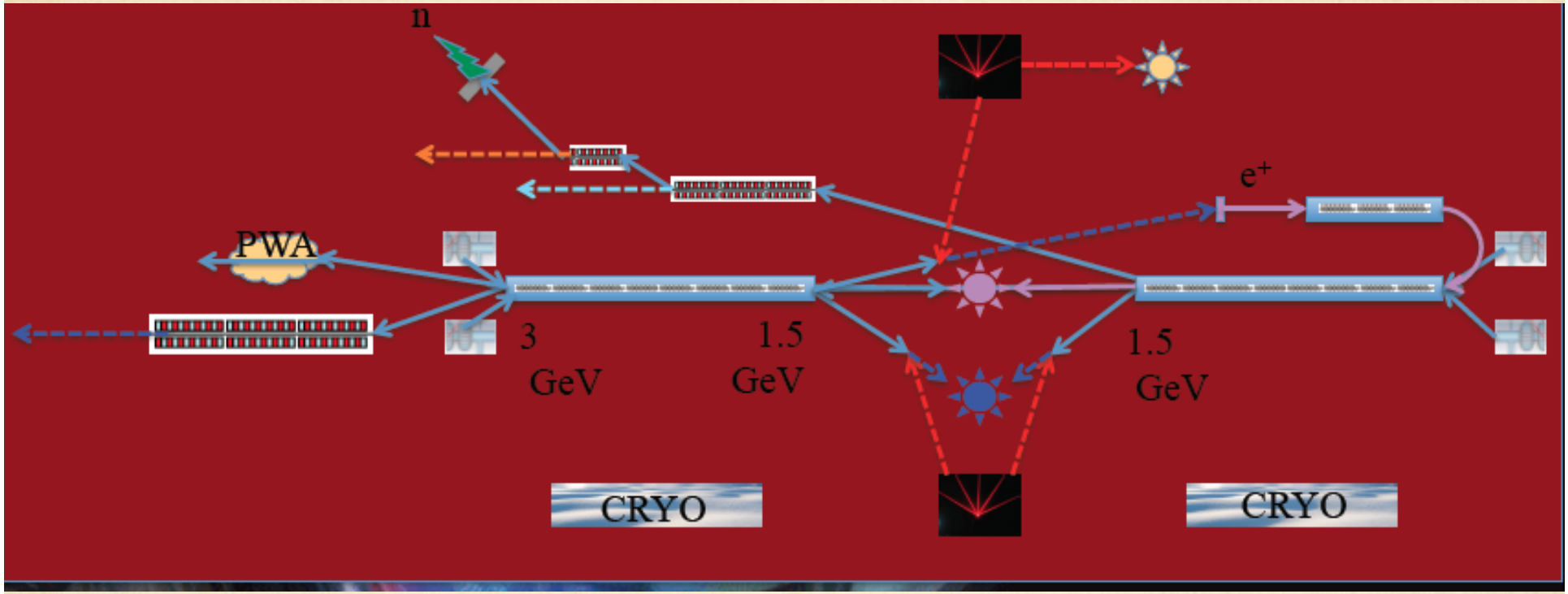
- Applied physics
  - Compton gamma rays (E_γ ~ 1-20 MeV)
  - FEL radiation
  - Neutrons (thermal, epithermal, fast)
  - Protons and pions (from photo production)
- Fundamental physics
  - e+ e- collisions
  - e+ γ collisions
  - γγ collisions

Fase 1



Compresa nei 250M (inclusi edifici)

Fase 2



Ordine di priorita' da definire → contribuite!

Applied Physics

Detectors

Development of ad-hoc detectors for:

- Short pulses (at sub-ps level)
- Neutrons
  - In case of TOF measurements the improvements in neutron detection improves energy resolution or (even better) reduces the length of the beam lines
- Compton gamma rays:
  - Measurement of energy spectrum and number of photons for bursts of $>10^6$ 1-20 MeV photons

Accelerator physics

- RF developments
- Diagnostics and controls

Applied physics

- Medical physics:
  - Pion therapy?
  - Neutron boron capture applications (or other neutron related)
  - Monochromatic gamma rays for diagnostics and therapy
  - ...
- Cultural heritage physics
  - Neutron radiography and tomography
  - Neutron Resonance capture
  - ...
- Homeland secutiry/environmental physics
  - Use of neutrons for N (explosives) or water detection
  - ...

Beam test facilities

- Electron beam
- Pion beam
- Neutrons (chip irradiation)
- Gammas from compton source

Fundamental physics

Physics Program of DAFNE-VE E_{cm}=1-2.5 GeV

- Test di precisione dello SM via $(g-2)_\mu$ $\alpha_{em}(M_Z)$
- Fisica "$\gamma\gamma$"
- Spettroscopia adronica di precisione e Fattori di Forma dei Barioni
- Ricerca di stati esotici e bosoni leggeri non previsti dallo SM

$e\gamma$ – $\gamma\gamma$ collisions

- Note: in this case $E\gamma \sim eV$
- π^0 width measurement
- $\gamma\gamma$ scattering
- Dark bosons

- Possible involvements in detectors

Brainstorming on fundamental physics

- Neutron EDM
- Photon-photon collisions → axions & millicharges
- e+e- collisions in non head-on configurations: lower Ecm and boost
  - Axions
  - Millicharges
  - Mu+mu- production at threshold → muon collider machine R&d?
  - pi+pi- production at threshold
- Use one B field or crystal instead of 1 gamma

Statistics might not be appropriate