Granular solid targets made of either fluidized tungsten powder or static pebble bed of tungsten spheres, have been long proposed and are being studied as an alternative configuration towards high-power (>1 MW of beam power) target systems, suitable for a future Super Beam facility or Neutrino Factory. Such assemblies offer many advantages as better thermal and inertial stress absorption, thermal cooling and, if in the fluidized form, regeneration. The proposed feasibility experiment will try on a pulse-by-pulse basis to address, observe and record the impact effects of a high-power pulsed beam on target samples of tungsten powder and tungsten pebble bed. Online diagnostic techniques using high-speed cameras, laser vibrometry and acoustic measurements, as well as offline, post-irradiation analysis of the target material will be employed in order to observe the effects.

**High Power Targetry**

In order to study rare particles, we need significant flux; 
high flux $\rightarrow$ High Power (MW)

Issues to consider for high-power targets:
- Thermal management (heat removal)
  - Target melting, vaporization
- Radiation damage
  - Change of material properties
- Thermal shock
  - Beam induced pressure waves

**Advantages of granular (powder) targets**

- Shock wave management
  - Material already broken
  - No cavitation
  - Shock waves constrained within grains
- Miscellaneous
  - Low eddy currents
  - Excellent flowability

**Hybrid granular targets**

**HiRadMat FACILITY at CERN/SPS**

- HiRadMat (High Radiation to Materials) facility designed to study the impact of intense pulsed beams on materials.
- Shares the same extraction from SPS as the LHC (Beam: 440GeV/c protons)

**Granular target test-experiment in HiRadMat**

Perform a **single-pulse** experiment to test in similar conditions as in a future Neutrino Factory configuration:
- a static tungsten powder target
- a pebble bed target with confined beads of ~3mm diameter
  - as proposed for the CERN-Frejus Super-beam

**Observation through high-reflectivity mirrors of possible disruption/explosion of the powder through high-speed camera, placed at T17, behind special shielding.**

**Online Diagnostics**

- **High-speed camera** for the observation of possible explosion
- **Microphones** for the recording of the sound impact of the beam on target
- **LDV** for the evaluation of the vibrations on the sample container

As well as offline post-irradiation analysis in a specialized facility in order to quantify structural differences on the target material.