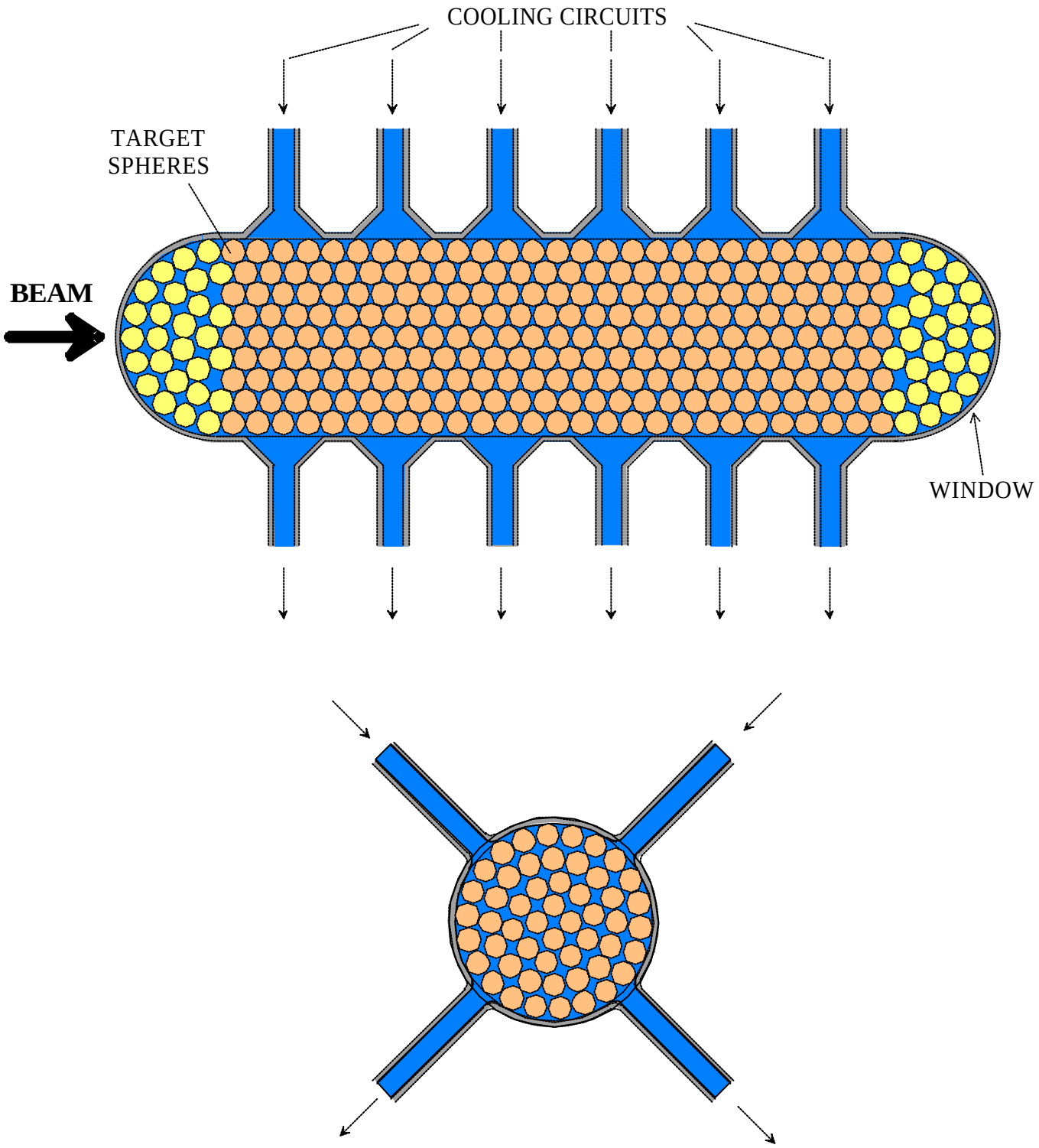
STATUS OF STATIONARY GRANULAR TARGET AND PERSPECTIVES

PETER SIEVERS – CERN

NuFact'02
July 2002

- **Tantalum (or Tungsten Carbide) Spheres :** $\varnothing$ = 2 mm, $\overline{\rho}$ = 0.6 x 16.8 ≈ 10 g / cm^3
- **Small static thermal stress:** Each sphere heated uniformly.
- **Small thermal shock waves:** Resonance period of a sphere is (0.26 μs) small relative to the heating time (3.3 μs).
- **Large Surface / Volume:** F/V~5000 cm^2/250 cm^3.Heat removed where deposited.
- **Heat Transfer Coefficients:** 20 kW / m^2 K for water,
  10 kW / m^2 K for He-gas, within reach.
- **Time constant of temperature decrease between pulses (20 ms):** ~ 40…80 ms
- **Set-up to measure heat evacuation from Granular "Wire Bunch" Target was under Construction, stopped due to lack of funding !**
- **Fatigue of Spheres:** 130 Mio. thermal cycles / month.
- **Integration of Target into Horn.**
- **Radiation damage of spheres, container and windows:** n x10 dpa's per n weeks. (see also SNS-Target)
- **Moving Window.**
- **Lifetime of Target > Horn to be expected ?**

GRANULAR TARGET COOLED BY LIQUID OR GAS



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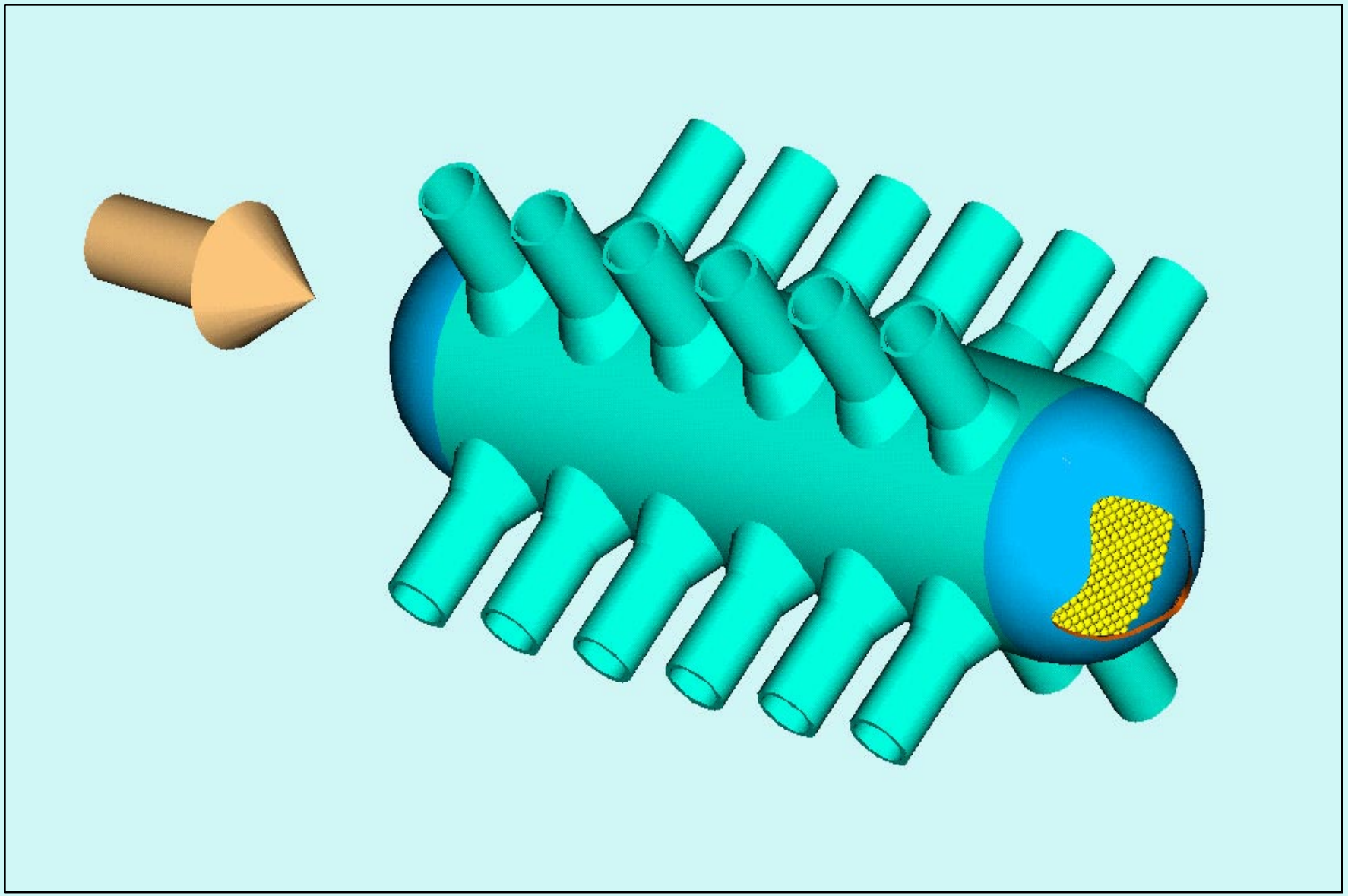
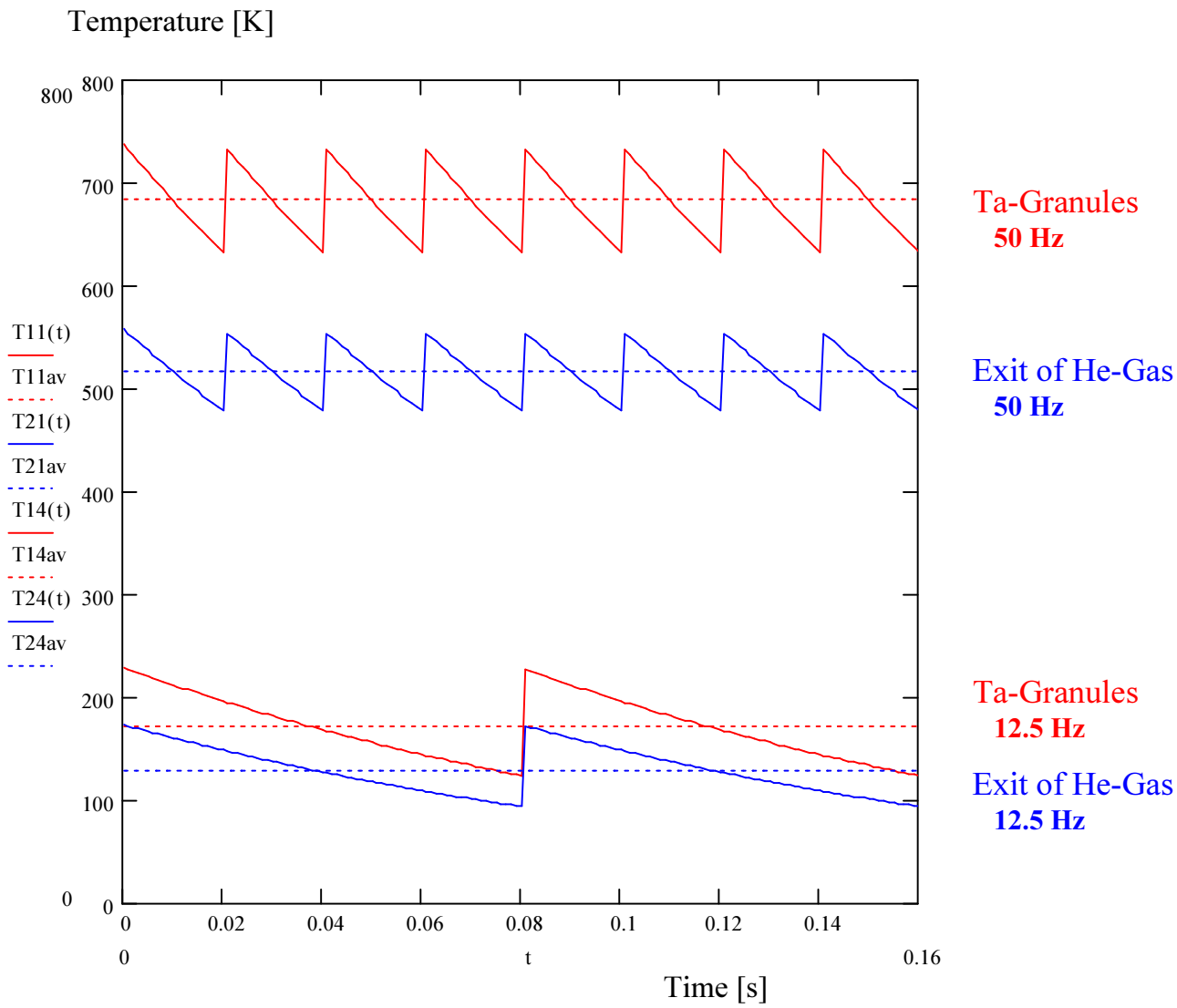
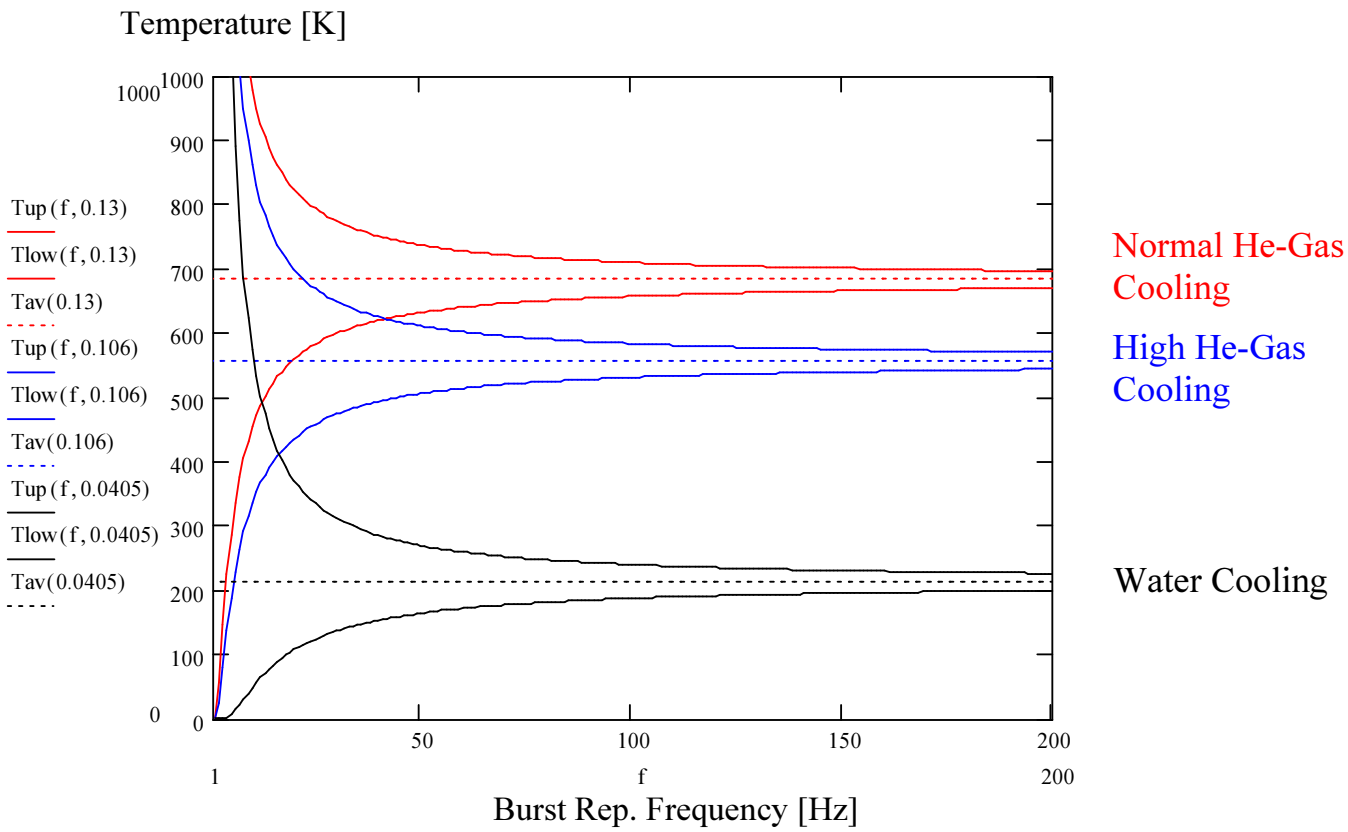


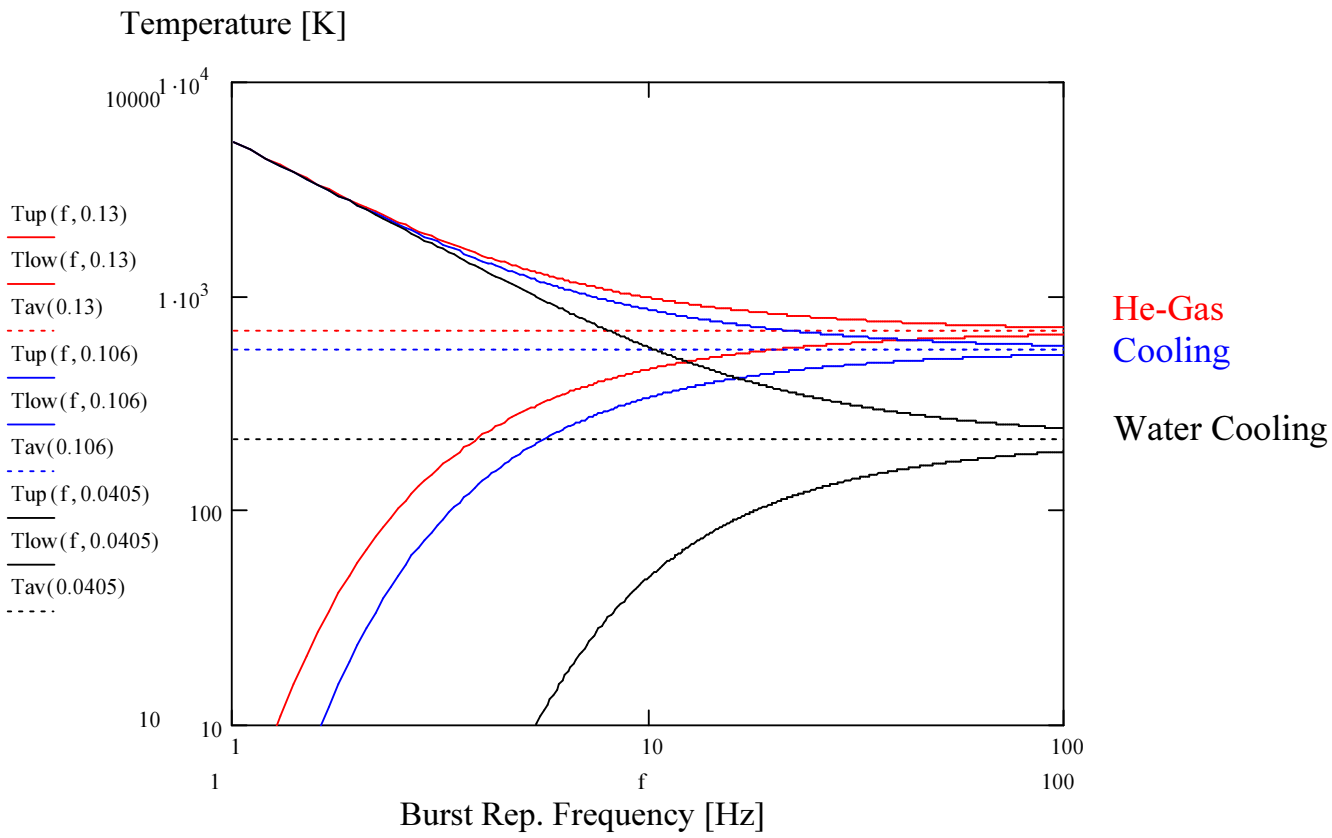
He-Gas COOLED GRANULAR Single (50Hz) and Quadruple (12.5Hz) TARGET
4 MW-BEAM



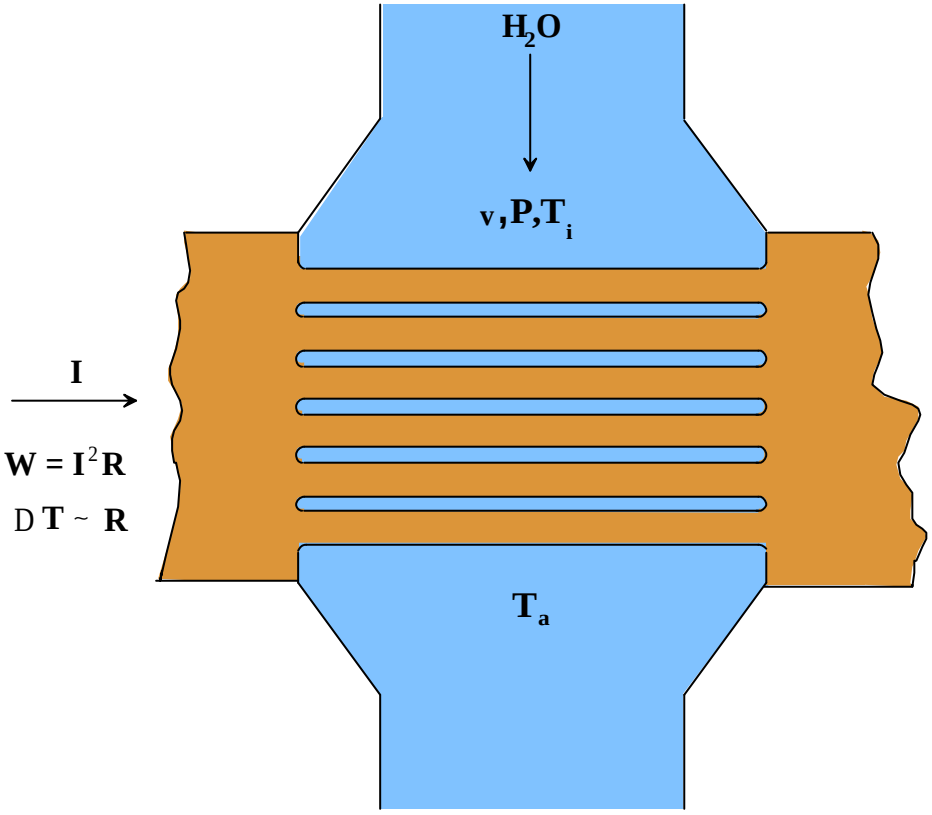
COOLED GRANULAR TARGET
4 MW-BEAM

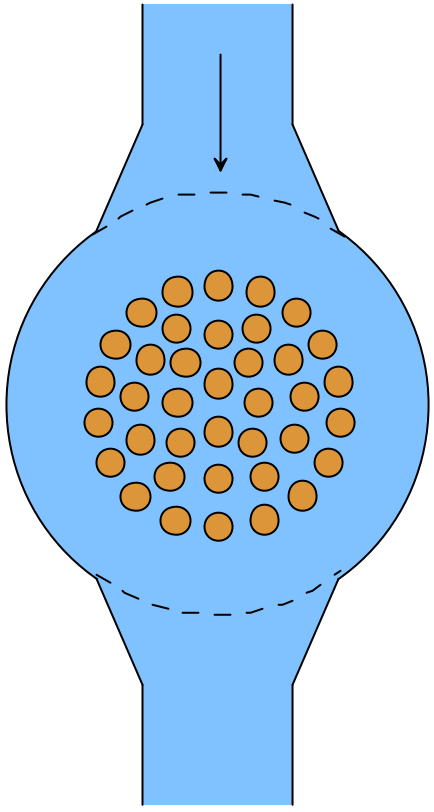


COOLED GRANULAR TARGET
4 MW-BEAM

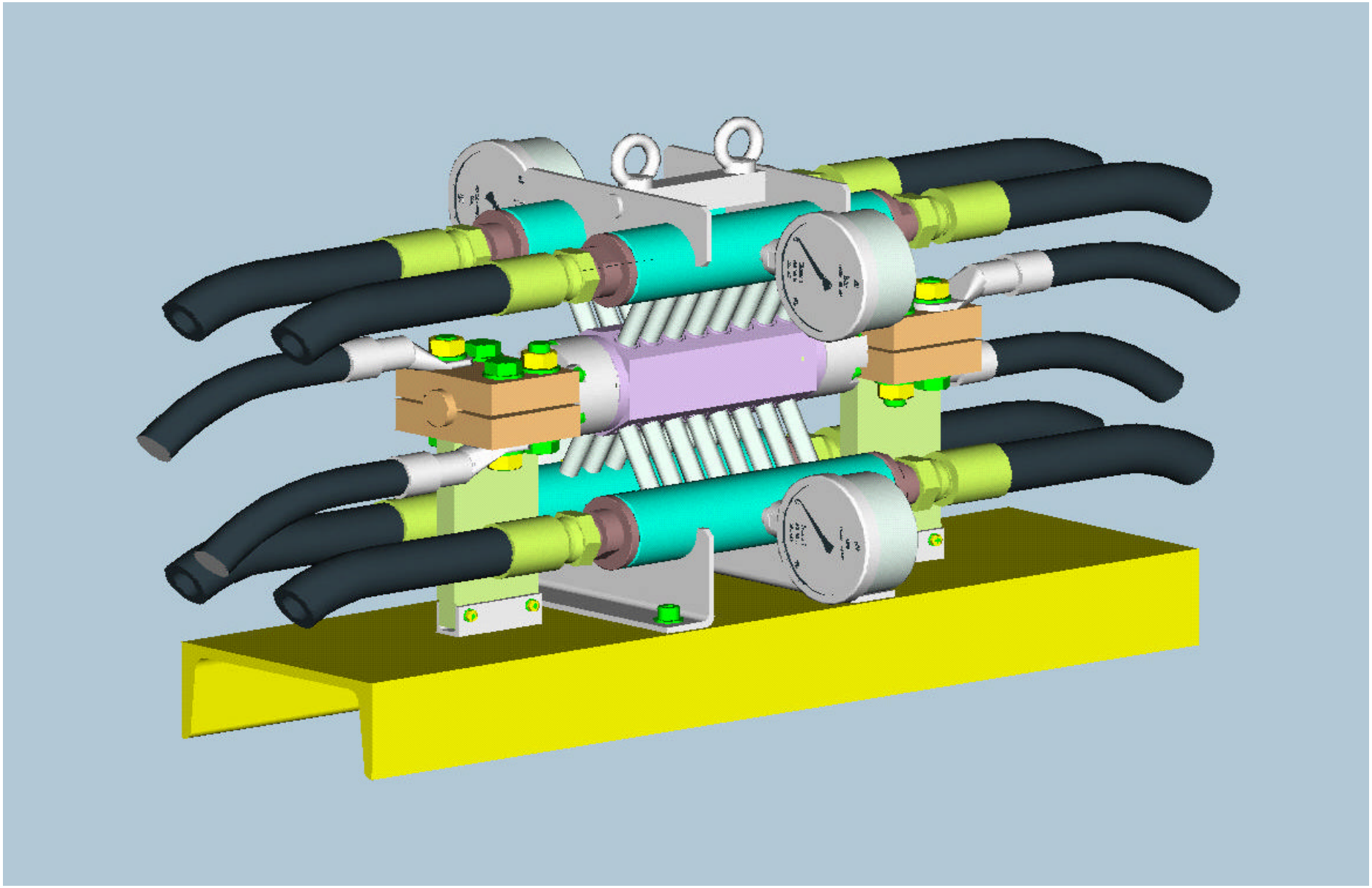


TEST SET-UP TO MEASURE HEAT TRANSFER COEFFICIENT





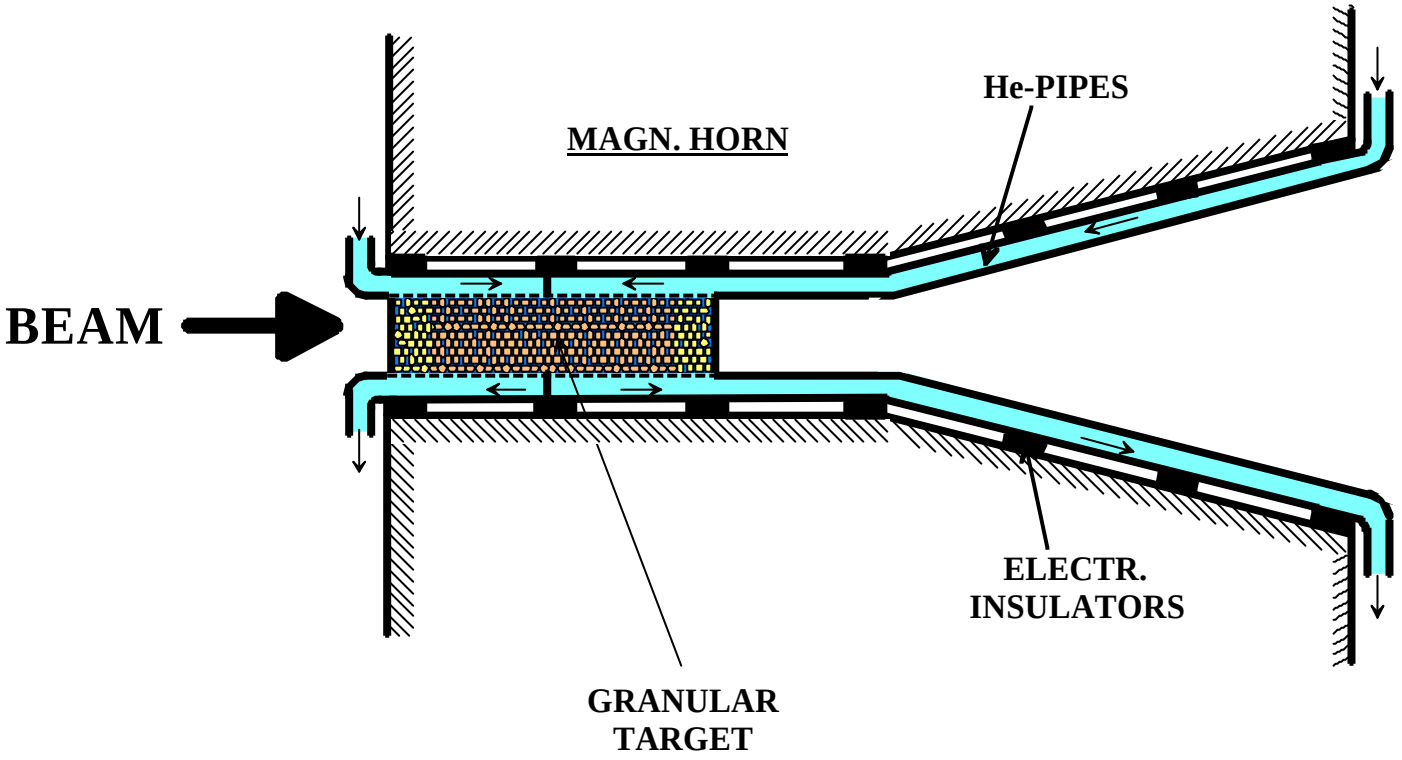
Test Circuit for High Power Heat Removal



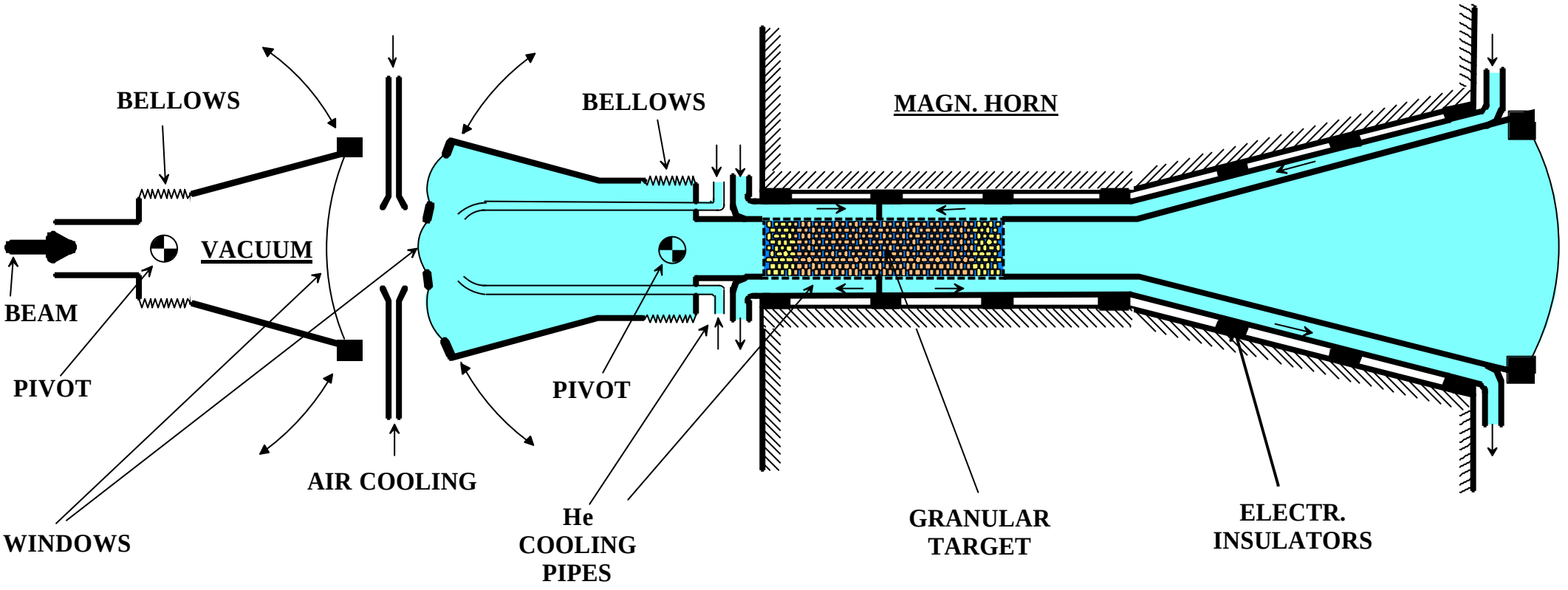
Peter Sievers

G. Laurent, Project Engineer

GRANULAR TARGET WITH He-GAS COOLING



GRANULAR TARGET WITH He-GAS COOLING AND WITH WINDOWS OF EXTENDED LIFETIME



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