

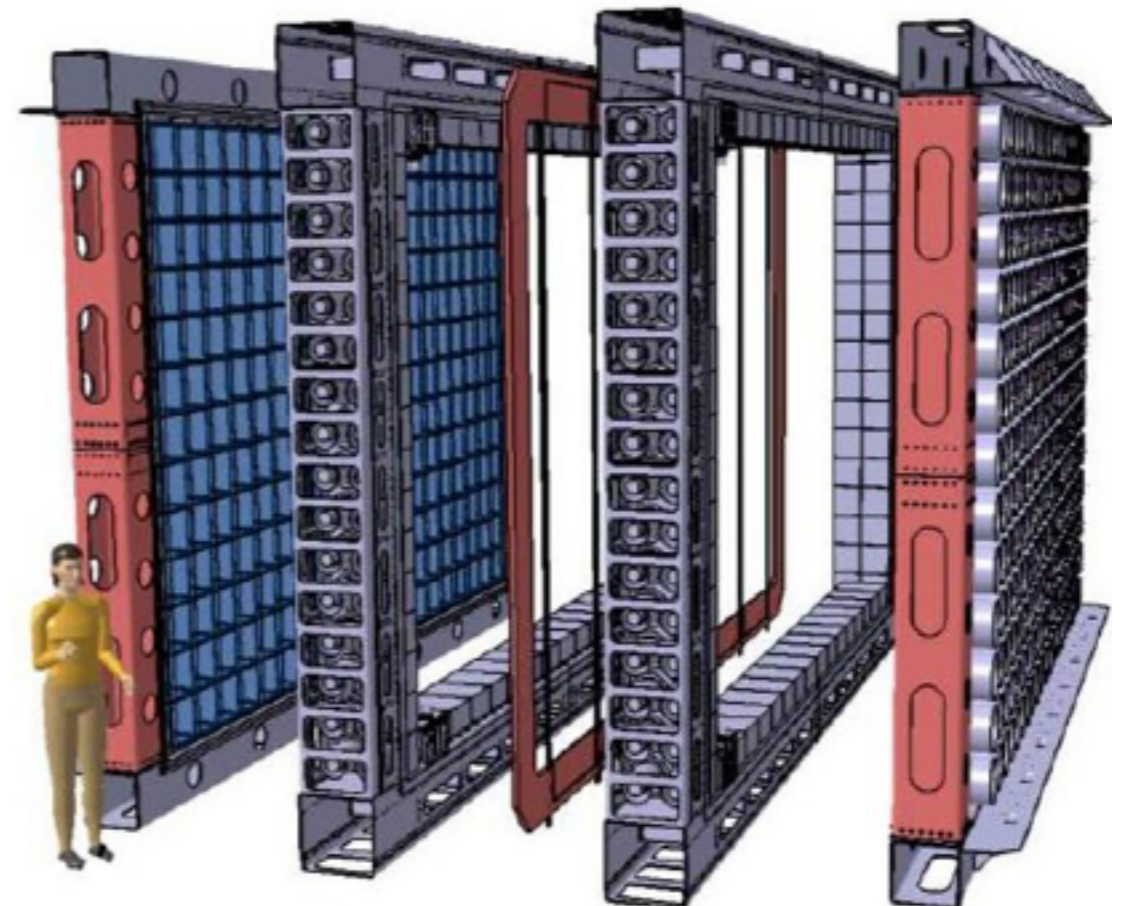
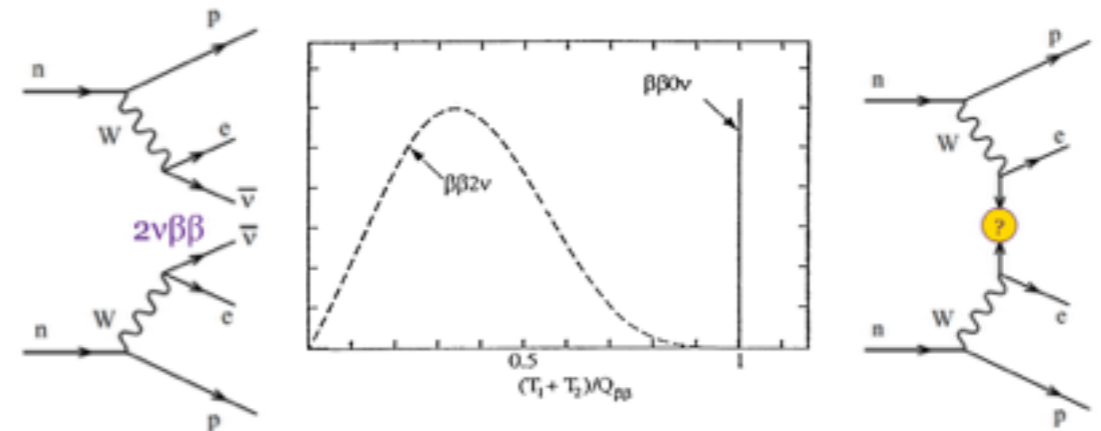
The SuperNEMO tracker construction and commissioning

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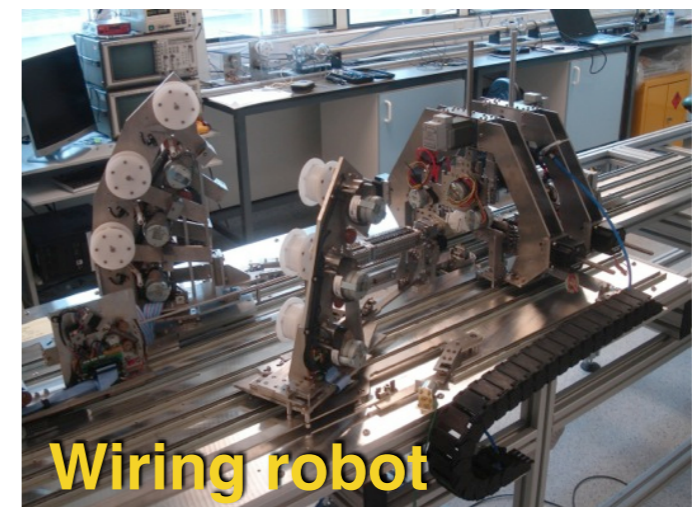
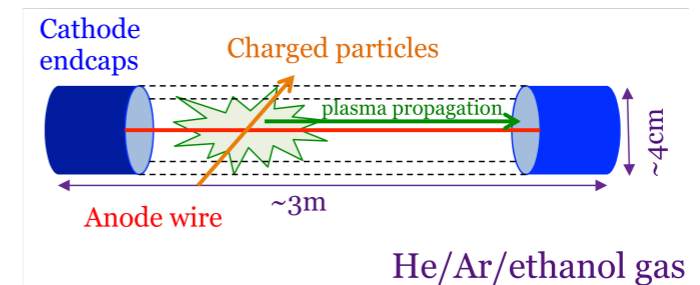
A SuperNEMO module

- $2\beta 0\nu$ decay search
 - are ν Majorana or Dirac? m_ν ? Mass hierarchy?
- 5-7kg (15m²) source foil (Se/Nd/Ca)
- calorimeter 4% FWHM@ $Q_{\beta\beta}$
- Tracker ~2000 tracker cells
- Full event reconstruction for bg rejection + high radiopurity -> $Bg < 10^{-4}$ counts/keV/ kg/y
- goal for demonstrator $\langle m_{\beta\beta} \rangle \sim$
0.20 - 0.40 eV



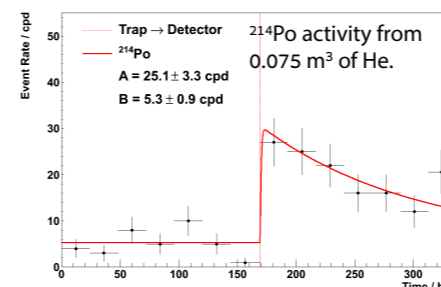
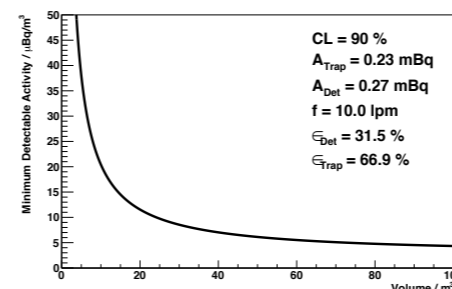
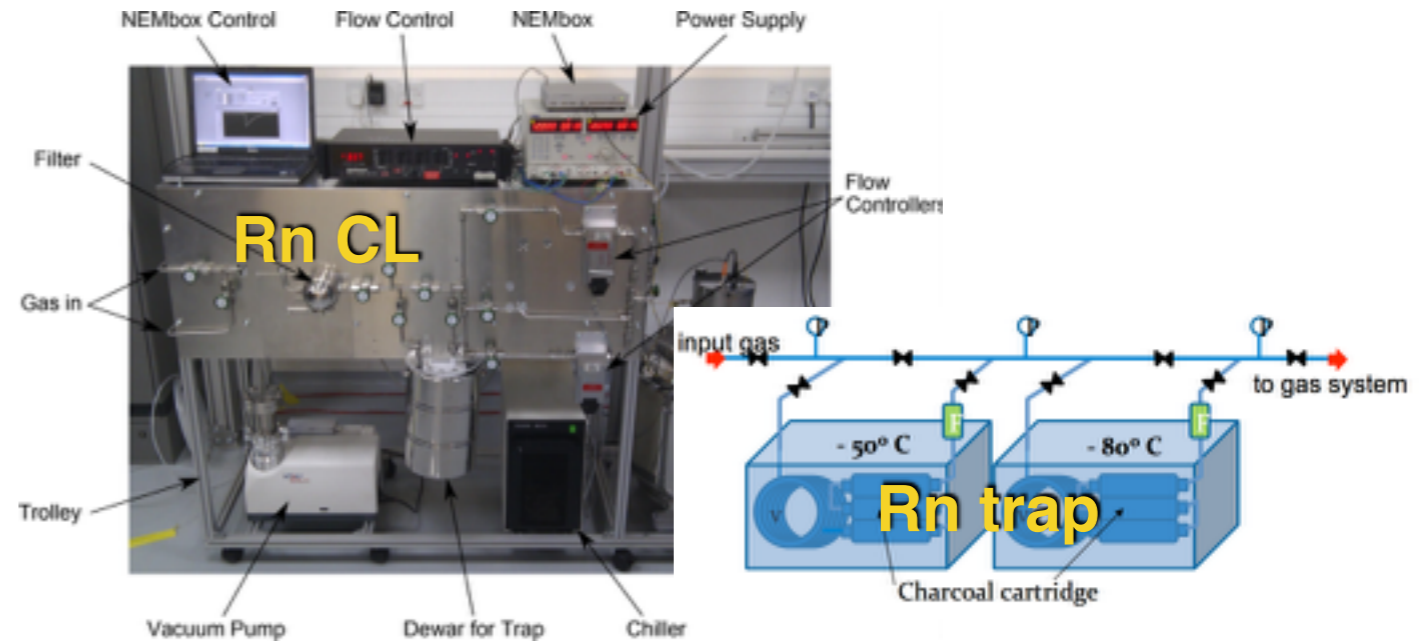
The SuperNEMO tracker

- octagonal cells operated in Geiger mode
 - (t_{anode} -> transverse coordinate; t_{cathode} -> longitudinal coordinate)
- High radiopurity extremely challenging
 - Only Duracon, copper and stainless steel allowed
 - automated construction + clean environment



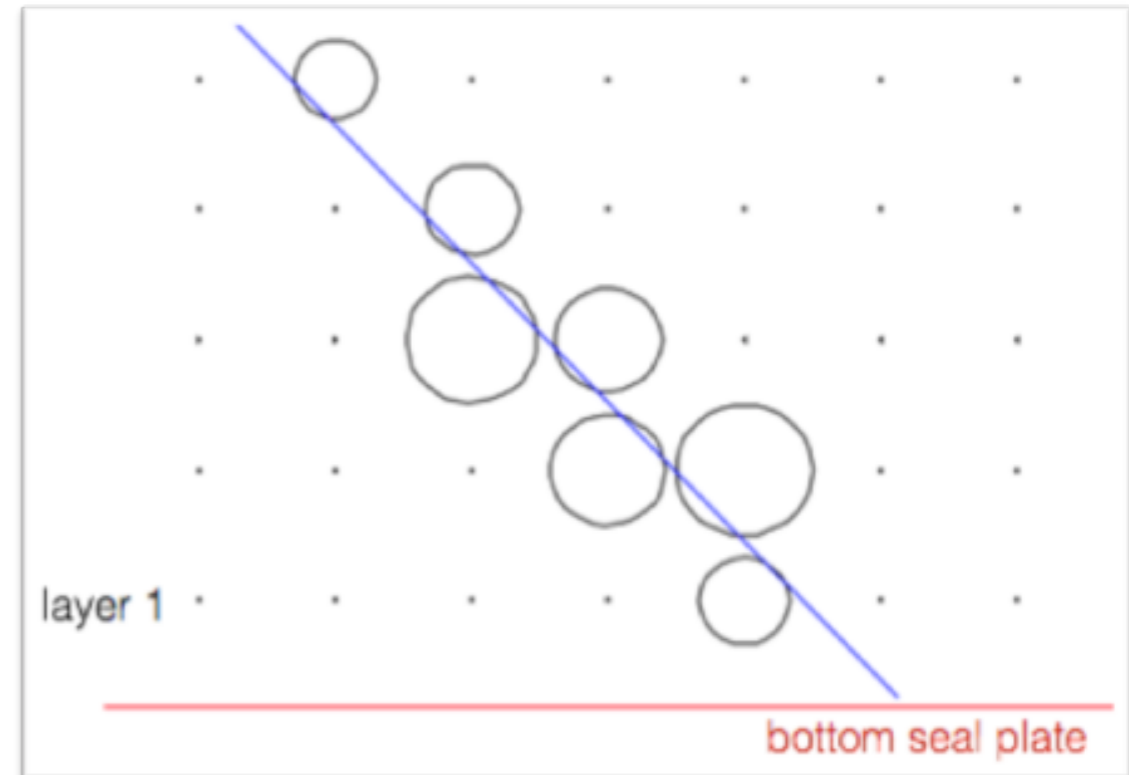
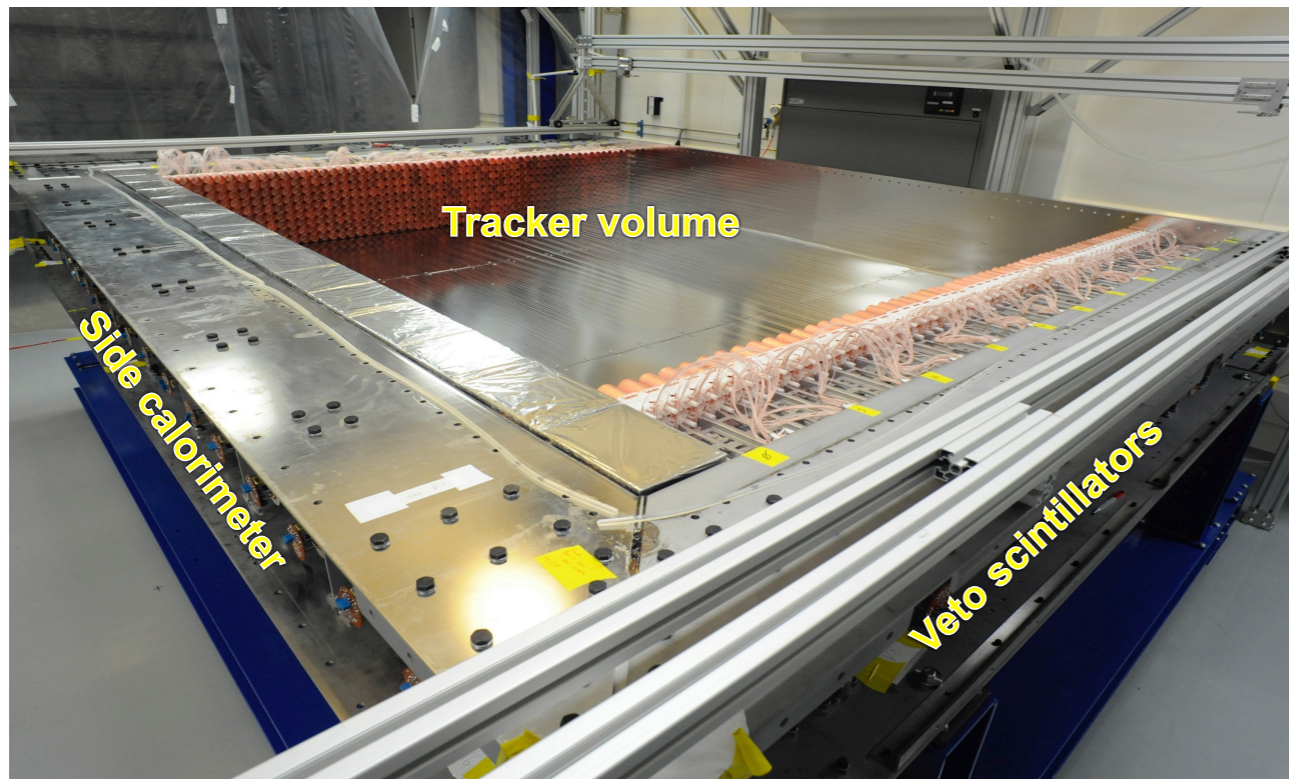
Rn emanation tests in MSSSL

- Every detector component is tested first with HPGe then for Rn emanation (Rn concentration line)
- SuperNEMO goal: Rn emanation < 0.15 mBq/m³
- Rn trap to filter tracker gas
 - expected 10^{10} suppression with He



Gas	Source	Radon Level ($\mu\text{Bq}/\text{m}^3$)
He	Cylinder	70 – 100
N ₂	Cylinder	400 – 1000
N ₂	Boil-off	90 – 140
N ₂	Rn-Trap	20 ± 12
He	Rn-Trap	< 5

First Tracker section



- First of four sections completed and under commissioning (first tracks measured), second section 50% assembled
- First section will be shipped to France later this year
- On schedule to commission Demonstrator Module in 2016

