The MINIBALL detector array

• MINIBALL collaboration:
  T.U.München, University of Köln, GSI-Darmstadt, K.U.Leuven, CERN-ISOLDE,
  University of Camerino, University of York, University of Liverpool, University of
  Surrey, University of Edinburgh,...

• Efficient and flexible array for low-multiplicity experiments with weak radioactive ion
  beams

• MINIBALL campaigns:
  • Summer campaign: CERN-ISOLDE
  • Winter campaigns:
    • Köln Tandem (including maintenance at Köln)
    • GSI (as part of RISING and stand along @ FRS)

• MINIBALL training schools (initiated 2007):
  • Little local support at ISOLDE
  • Define competence and expert levels (definition see MINIBALL website)
  • Availability of competence and expert level person is a condition to run
  • Ad-hoc training sessions (during maintenance, setting-up, experimental runs)
K.U. Leuven

- MINIBALL campaigns @ CERN-ISOLDE

- Towards the doubly magic $^{100}$Sn
- Mixed symmetry states in $^{88}$Kr
- Shape coexistence in $^{70}$Se
- Shape coexistence n-rich Sr
- g-factors in Te isotopes:
- B(E2) measurements around $^{132}$Sn
- "Island of inversion at N=20"
- N=40: Coulex of $^{68,70,72}$Cu (isomeric beams)
- Fusion reactions with neutron-rich nuclei
- Neutron transfer reactions on $^{30}$Mg
- Stellar reaction: $^{14}$O(a,p)$^{17}$F
- Coulex of neutron-deficient Hg isotopes
• Coulomb excitation of Zn isotopes

- $^{80}$Zn @ $^{108}$Pd (2.0 mg/cm$^2$)
- Energy = 2.79 MeV/u
- Intensity = 3000 pps
- Purity = 43 (5) %
- REX performance: efficiency

![Diagram of beamline components including MASS SEPARATOR, 7-GAP RESONATORS, and ISOLDE beam]
HIE-ISOLDE: High Intensity and Energy Isolde

- Energy upgrade 3 – 5.5 – 10 MeV/u: super conducting
- Intensity upgrade, target, ion source, cooler, breeder
- Beam quality upgrade

- New instrumentation:
  - Short term: new set-up for transfer reactions
  - Longer term: Recoil spectrometer

MINIBALL detectors
position sensitive silicon detectors