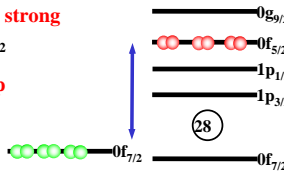


J.M.Daugas, M.Sawicka, M.Pfützner, I.Matea, R.Grzywacz, N.L.Achouri, J.C.Angélique, D.Baiborodin, F.Becker, G.Bélier, R.Bentida, R.Béraud, C.Bingham, C.Borcea, R.Borcea, E.Bouchez, A.Buta, W.N.Catford, E.Dragulescu, A.Emsallem, G.de France, J.Giovinazzo, M.Girod, H.Goutte, G.Gorgiev, H.Graue, F.Hammache, F.Ibrahim, K.L.Jones, R.C.Lemmon, M.Lewitowicz, M.J.Lopez-Jimenez, P.Mayet, V.Méot, F.Negoita, F.de Oliveira-Santos, O.Perru, P.H.Regan, O.Roig, K.Ryckaczewski, M.G.Saint-Laurent, J.E.Sauvestre, G.Sletten, O.Sorlin, M.Stanoi, I.Stefan, C.Stodel, C.Theisen, D.Verney and J.Zylicz

Structure of Neutron-Rich Nuclei around N=40

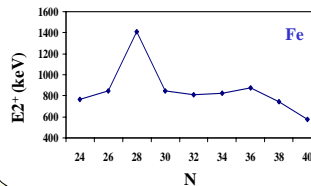
Evolution of the shell gap going away from stability

Z=28 spin-isospin interaction ⇒ **strong attraction** between $\pi 1f_{7/2}$ and $\nu 1f_{5/2}$
 Z<28 attraction decreases ⇒ **gap** between $\nu 1p$ and $\nu g_{9/2}$ **decreases**



T.Otsuka et al., Phys.Rev.Lett. 87, 082502 (2001)

Evolution of the energy of the first 2+ state for the Fe isotopic chain



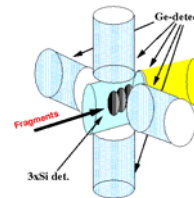
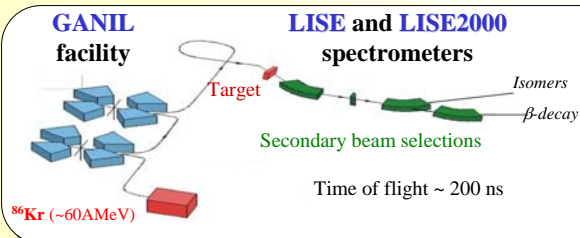
Lowering of the E2+ for N>36 ⇒ down-sloping $\nu[440]1/2^+$ and $\nu[431]3/2^+$ orbitals: **intruder states**
Minimised E_p leads to **deformation**
⁶⁶Fe E2+=574keV $\beta_2 \approx 0.26$
 M.Hannawald et al., Phys.Rev.Lett. 82, 1391 (1999)

Study of Single Particle Structure in Neighbor Nuclei and Evolution of the Collectivity with N

Experiments

Results from 2 different experiments

One dedicated on the Search of New Isomeric States
 One dedicated on Half-Life and β - γ Measurements



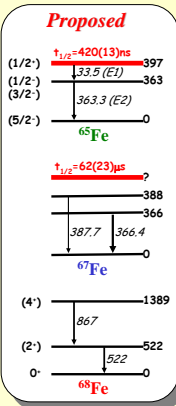
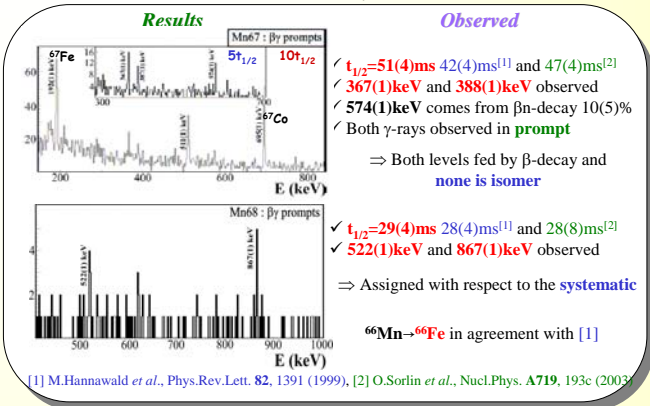
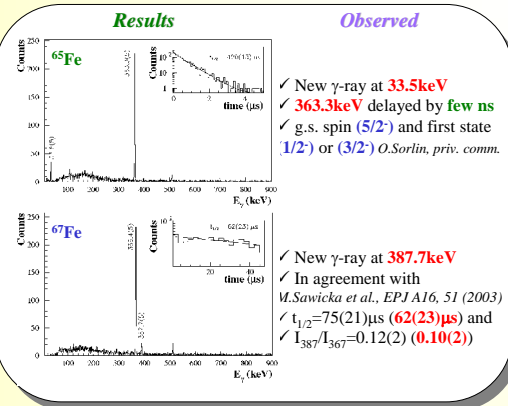
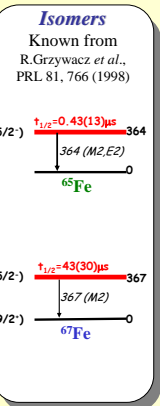
Isomers
 Target: Ni (100 μ m) + Be (500 μ m)
 1 Clover (120%), 2 single crystals (90% and 80%) and 1 LEPS
 γ efficiency: **6.2% @ 1.33MeV**
28% @ 130keV

β -decay
 Target: Ta (30 μ m) + C (100 μ m)
 Implantation in Double Side Si strip Detector
 β efficiency: **23%**
 4 Clover-type EXOGAM detectors
 γ efficiency: **5.5% @ 1.33MeV**
26% @ 120keV

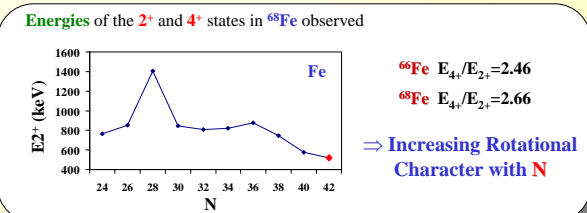
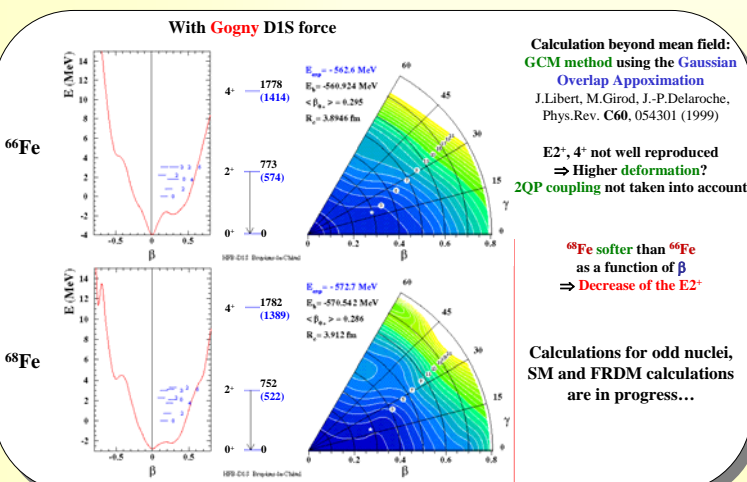
Isomeric States for N=39 and N=41 Fe isotones

β -decay for ⁶⁷Mn and ⁶⁸Mn Nuclei

I.Matea, PhD Thesis, University of Caen (2003)



Mean-field and beyond calculations for Fe isotopes



Low energy γ -ray isomeric transition in ⁶⁵Fe spin assigned wrt β -decay
 Isomeric state of ⁶⁷Fe not fed by β -decay, E* < 420keV and no spin assigned
 HFB and beyond calculations reproduce the lowering of the 2+ and 4+ states and suggest a β deformation of 0.295 and 0.286 for ⁶⁶Fe and ⁶⁸Fe

