Production Cross-sections, Spin Distributions and Isomeric Ratios from Relativistic Projectile Fragmentation of ^{107}Ag Using RISING

S. Pietri[1], P.H. Regan[1], A.B. Garnsworthy[1,3], Zs. Podolyák[1], D. Rudolph[2], S.J. Steer[1], R. Hoischen[2], T. Kurtukian-Nieto[4], M. Górska[5], J. Gerl[5], H.J. Wollersheim[5], F. Becker[5], P. Bednarczyk[5,6], L. Caceres[5,7], P. Doornenbal[5], H. Geissel[4], J. Grębosz[5,6], A. Kelic[5], I. Kojouharov[5], N. Kurz[5], F. Montes[5], W. Prokopowicz[5], T. Saito[5], H. Schaffner[5], S. Tachenov[5], A. Heinz[3], M. Pfützner[8], G. Benzoni[9], M. Hellström[2], A. Jungclaus[7], L.-L. Andersson[2], L. Atanasova[10], D. Balabanski[11], M.A. Bentley[12], B. Blank[13], A. Blazhev[14], C. Brandau[1,5], J. Brown[12], A.M. Bruce[15], F. Camera[9], W.N. Catford[1], I.J. Cullen[1], Zs. Dombrádi[16], E. Estevez[4], C. Fahlander[2], W. Gelletly[1], G. Ilie[14], E.K. Johansson[2], G.A. Jones[1], M. Kmiecik[6], F.G. Kondev[17], S. Lalkovski[10], Z. Liu[1], A. Maj[5], S. Myalski[5], T. Shizuma[1,18], A.J. Simons[1], S. Schwertel[19], P.M. Walker[1], E. Werner-Malento[5,8], O. Wieland[9]

[1] *Department of Physics, University of Surrey, Guildford, GU2 7XH, UK*
[2] *Department of Physics, Lund University, S-22100, Lund, Sweden*
[3] *WNSL, Yale University, New Haven, CT 06520-8124, USA*
[4] *Universidad de Santiago de Compostela, E-15706, Santiago de Compostela, Spain*
[5] *GSI, Planckstrasse 1, D-64291, Darmstadt, Germany*
[6] *The Henryk Niewodniczański Institute of Nuclear Physics, PL-31-342, Kraków, Poland*
[7] *Departamento de Fisica Teórica, Universidad Autonoma de Madrid, E-28049, Madrid, Spain*
[8] *IEP, Warsaw University, Hoża 69, PL-00-681*
[9] *INFN, Universitá degli Studi di Milano, I-20133, Milano, Italy*
[10] *Faculty of Physics, University of Sofia, BG-1164, Bulgaria*
[11] *Dipartimento di Fisica, Universitá di Camerino, I-62032, Italy*
[12] *Dept. of Physics, University of York, Heslington, York, Y01 5DD, UK*
[13] *CENBG, le Haut Vigneau, F-33175, Gradignan Cedex, France*
[14] *IKP, Universität zu Köln, D-50937, Köln, Germany*
[15] *School of Engineering, University of Brighton, Brighton, BN2 4GJ, UK*
[16] *Institute for Nuclear Research, Debrecen, H-4001, Hungary*
[17] *Nuclear Engineering Division, Argonne National Laboratory, Argonne IL-60439, USA*
[18] *Japan Atomic Energy Agency, Kyoto, 619-0215, Japan*
[19] *Physik Department E12, Technische Universität München, Garching, Germany*

We report the first results from a systematic measurement of production cross-sections and associated isomeric ratios for a wide range of secondary products produced following the relativistic (750 MeV per nucleon) projectile fragmentation of a ^{107}Ag primary beam at GSI. This work forms part of The Stopped Beam section of the *Rare Isotopes Investigations at GSI* (RISING) project. The exotic fragments were separated and identified event-by-event using the GSI FRagment Separator (FRS) with the final reaction products stopped in a 7mm thick copper block placed at the final focal point of the FRS and viewed by the high-efficiency, high granularity Stopped RISING gamma-ray spectrometer. This new gamma-ray array comprises 15 high-efficiency germanium cluster detectors, providing a typical singles gamma-ray photon efficiency of between 10 and 20% depending on the distance of the implanted ions along the final focus of the FRS. Time-correlated gamma decays from individually identified nuclear species have been measured, allowing the clean identification of isomeric decays in an unprecedented range of exotic nuclei extending from near-stable isotopes to nuclei along the N=Z line at the proton drip-line for masses A=70→100 and Z=38→47. An overview of the experimental technique will be given, together with the measurements of production yields and evaluated isomeric ratios. These data will be compared to EPAX simulations for the production cross-section and the abration-ablation and 'sharp cut-off' models for relativistic fragmentation (e.g, see ref. [1] for details) in order to obtain new insights into the angular momentum production in projectile fragmentation reactions at relativistic energies

[1] Zs. Podolyák et al., Phys. Lett. **B632**, 203 (2006); K.A. Gladnishki et al., Phys. Rev. **C68**, 024617 (2004); M. Pfützner et al., Phys. Rev. **C65**, 064604 (2002).