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## EXPLORING NUCLEAR STABILITY NEAR N=162 AND Z=108

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Recent experiments [1] performed in the framework of the Dubna-Livermore collaboration have led us to the discovery of the three new heaviest nuclides, $^{266}106$, $^{265}106$, and $^{262}104$, that were produced in the $^{248}Cm+^{22}Ne$ reaction by employing the Dubna gas-filled recoil separator [2]. The identification of the new species was based on establishing genetic links between $\alpha$ decays of the mother nuclides and subsequent $\alpha$ or spontaneous-fission (SF) decays of their descendants.

| Nuclide | Principal decay mode | Alpha-particle energy *MeV* | Half-life *s* |
|---|---|---|---|
| $^{266}106$ | $\alpha$ | 8.63±0.05 | 10–30 |
| $^{265}106$ | $\alpha$ | 8.71 to 8.91 | 2–30 |
| $^{262}104$ | SF | | $1.2^{+1.0}_{-0.5}$ |

The ground-state decay properties that we established for the new nuclides (see the Table and Ref.[1]) indicate a large enhancement in their SF stability and thus confirm the existence of the predicted deformed shells N=162 and Z=108 [3,4]. Our data clearly show that the SF stability at Z=106 and N=160 is not reduced by the destabilizing effect of the new fission valley which was predicted by theory to develop close to the fragment magic numbers N=2×82 and Z=2×50, to present up to Z=110, and to lead, with a low collective inertia, to very compact scission shapes and very short SF half-lives in the sub-*ms* range [5]. The discovery of the significant nuclear stability near N=162 and Z=108 creates new opportunities for many further explorations at the edge of the nuclear domain.

During February, March, and April of 1994 we are performing further experiments to explore properties of unusually stable nuclei near N=162 and Z=108. In this series of experiments, targets of $^{238}U$ are bombarded with high-intensity beams of $^{34}S$ accelerated by the Dubna U400 cyclotron. The aim of these long-term bombardments is to produce $^{267}108$ and $^{268}108$. The experiments will be finished by April 30 with an expected total beam dose of about $2\times10^{19}$ particles $^{34}S$. Findings of these experiments will be presented.

References

[1] Yu.A.Lazarev et al., JINR Preprint E7-94-80, Dubna, 1994; submitted to *Phys. Rev. Lett.*

[2] Yu.A.Lazarev et al., *Proc. Int. School-Seminar on Heavy Ion Physics (Dubna, 1993)*, JINR Report E7-93-274, Dubna, 1993, Vol. 2, p.497.

[3] S.Ćwiok et al., *Nucl. Phys.* A410, 254 (1983).

[4] Z.Patyk et al., *Nucl. Phys.* A502, 591c (1989); *ibid.* A533, 132 (1991).

[5] P.Möller et al:, *Nucl. Phys.* A469, 1 (1987); *ibid.* A492, 349 (1989); *ibid.* A549, 84 (1992).