

FISSION OF U, Au AND Ag INDUCED BY 400 GeV PROTONS

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In this paper the first results are reported of an experimental investigation of the uranium, gold and silver fission induced by protons of an energy of 400 GeV. A polycarbonate (makrofol) was used as a detector of fission fragments. Use was made of the well-known sandwich technique, which enables one to make a fission analysis in 4π geometry.

The detector was exposed to the high-energy protons at FNAL (Batavia). After exposure the detector was chemically treated as described previously⁽¹⁾, and then scanned with an optical microscope. Events with one, two, three and four fragments were found. The obtained percentage ratio of ternary to binary events (T/B) is given in Table I along with former results referring to several different incident proton energies below 400 GeV^(1,2). At energies above 200 GeV the T/B ratio increases with increasing energy.

Table I

Target	T/B					
	14 GeV	18 GeV	23 GeV	200 GeV	300 GeV	400 GeV
U	1.5 \pm 0.4	2.0 \pm 0.3	1.7 \pm 0.2	1.35 \pm 0.2	1.53 \pm 0.2	1.6 \pm 0.3
Au	4.1 \pm 0.8	3.7 \pm 0.7	2.5 \pm 0.6	-	-	2.3 \pm 0.3
Ag	0.6 \pm 0.1	3.1 \pm 0.6	1.1 \pm 0.2	-	-	1.5

Table II gives the mean values of fission fragment track lengths (the range, R) and standard deviations (SD). As the proton

E (GeV)	Table II	energy increases the range of			fission fragments decreases. It also decreases with decreasing target Z. These results are in accordance with the hypothesis that fission energy is due to Coulombic force of repulsion.
		U	Au	Ag	
18	R	16.1	14.9	12.6	
	SD	4.0	4.0	5.0	
300	R	15.6	-	-	
	SD	3.7	-	-	
400	R	14.3	13.4	11.0	
	SD	3.5	6.0	7.0	

References

1. Ž.Todorović and R.Antanasijević, *Nuovo Cimento* **33A**, 546 (1976)
2. M.Debeauvais, J.Tripiet and S.Jokić, *The 9th International Conference on Solid State Nuclear Track Detectors, Munich, 1976.*