

The background features a gradient from red at the top to blue at the bottom, overlaid with faint technical diagrams of circular gauges and scales. The main title is centered in white, bold, uppercase letters.

ODZIV RADIOFOTOLUMINISCENTNIH DOZIMETARA U SNOPU PROTONA

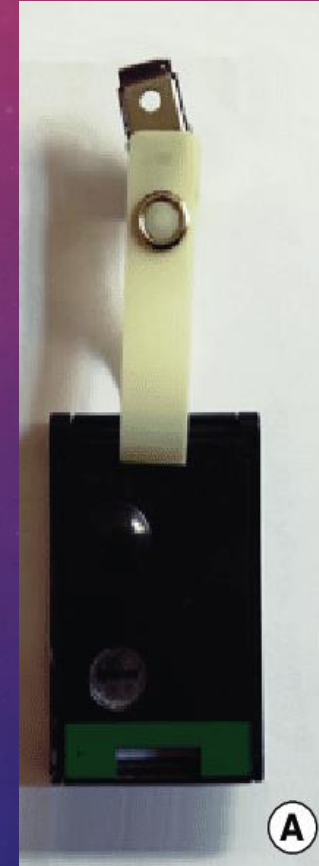
LUKA PASARIČEK

UVOD

- Dozimetar
- Apsorbirana doza

$$D = \frac{E_{\text{poh}}}{m} \left[Gy = \frac{J}{kg} \right]$$

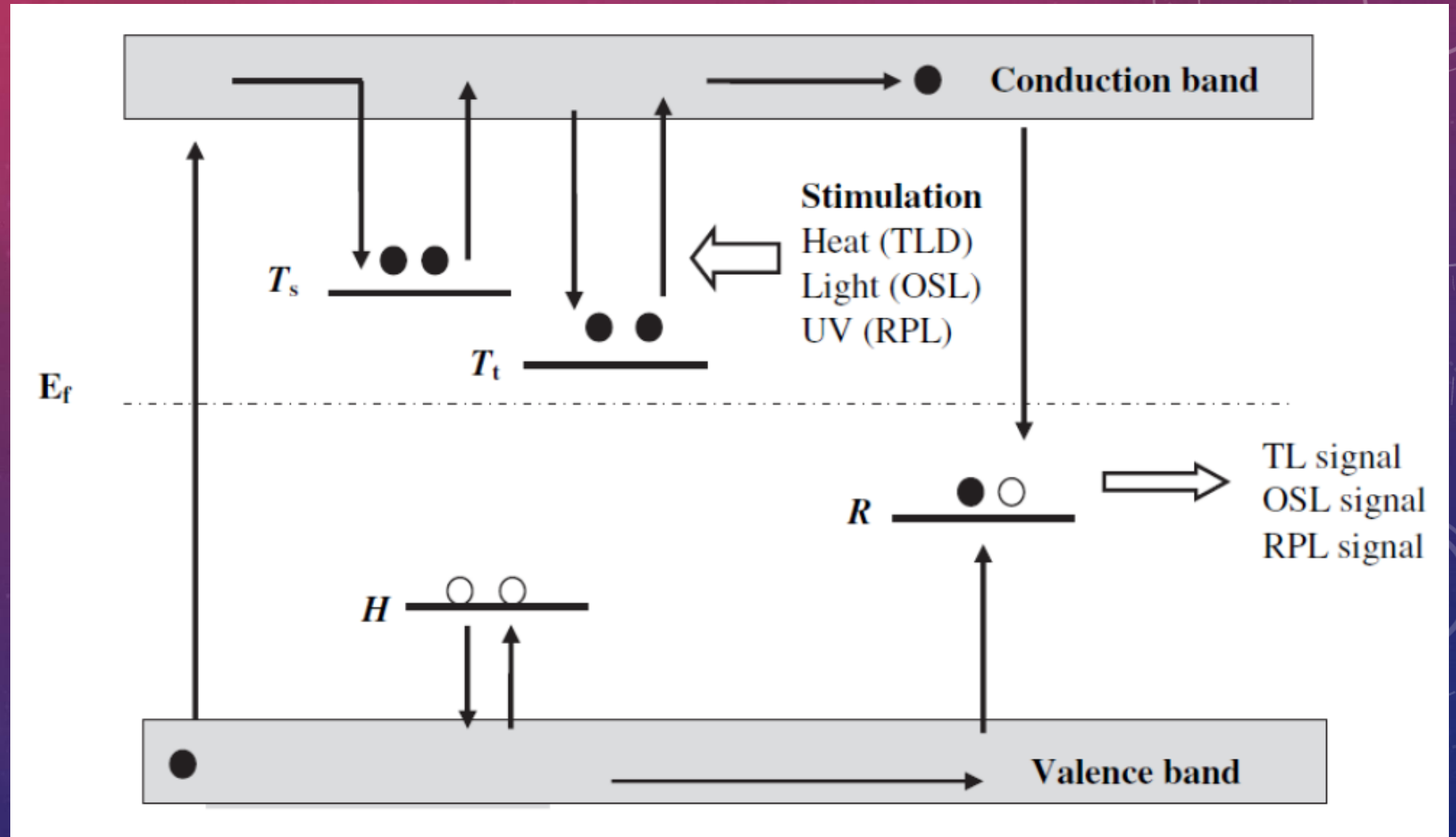
- Poželjna dozimetrijska svojstva



LUMINISCENCIA

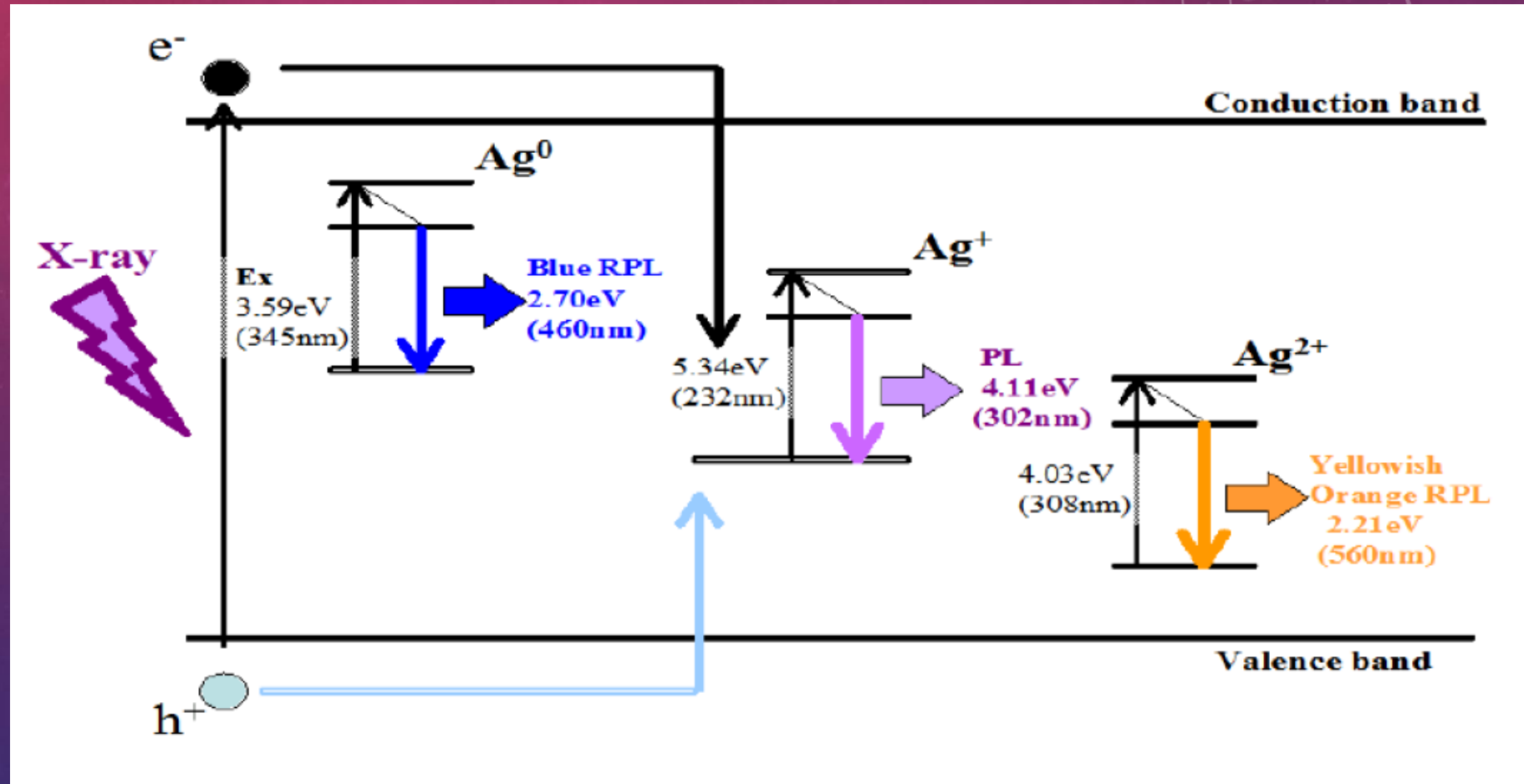
- Fluorescencija
- Fosforescencija

- TLD, OSL, RPL



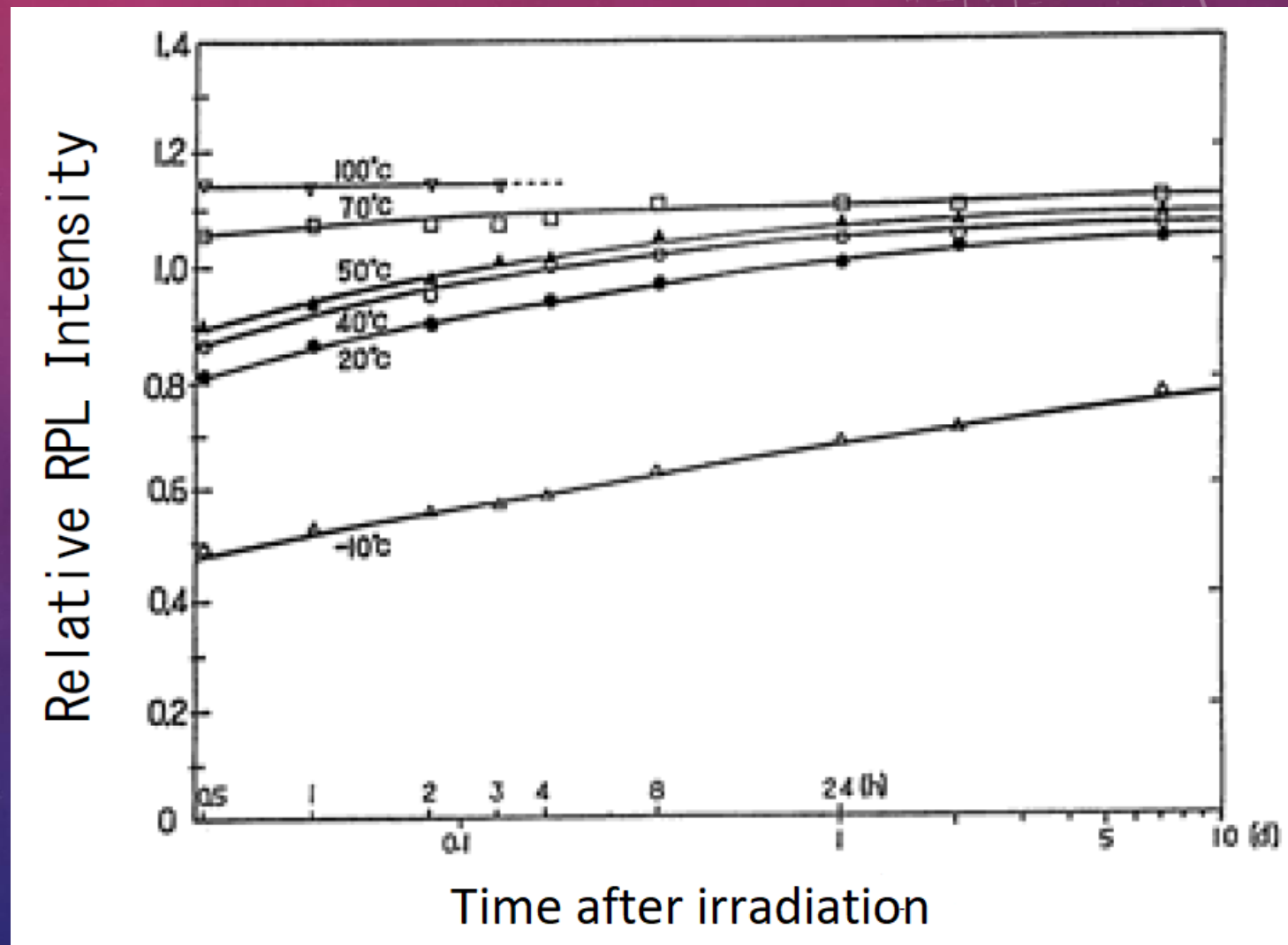
PRINCIP RADA

- Staklo dopirano srebrom Ag^+
- Elektroni i šupljine
- RPL centri



MJERNI CIKLUS

1. Aniliranje
2. Očitavanje početnog signala
3. Zračenje
4. Predgrijavanje
5. Očitavanje signala ozračenog dozimetra

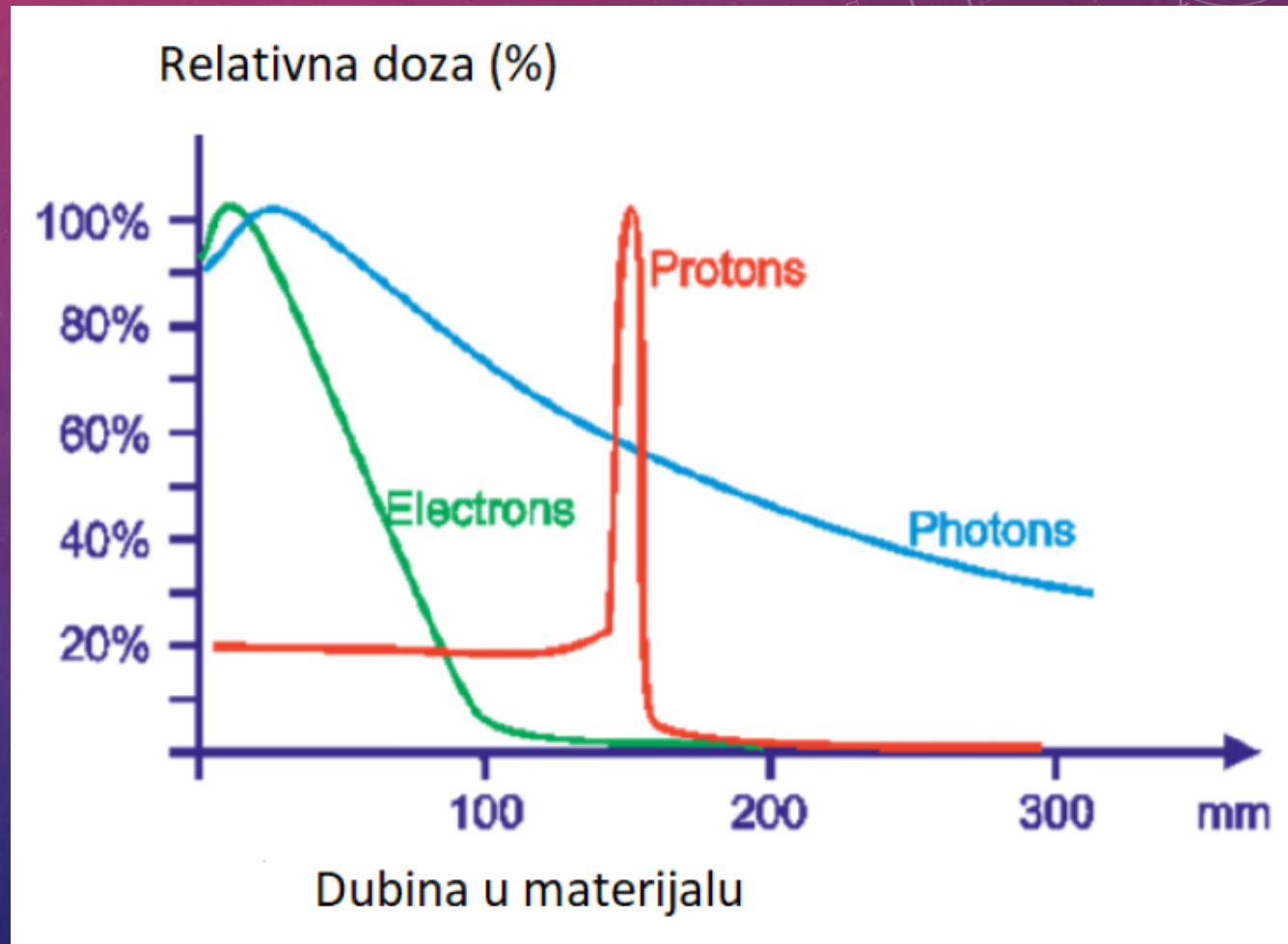


MEĐUDJELOVANJE PROTONA I MATERIJE

- Kulonska interakcija s jezgrom i elektronima atoma sredstva
- Bragova krivulja
- Linearni prijenos energije (LET)

$$L = \frac{dE}{dx}$$

- Radioterapija



EKSPERIMENTALNI POSTAV I OBRADA PODATAKA

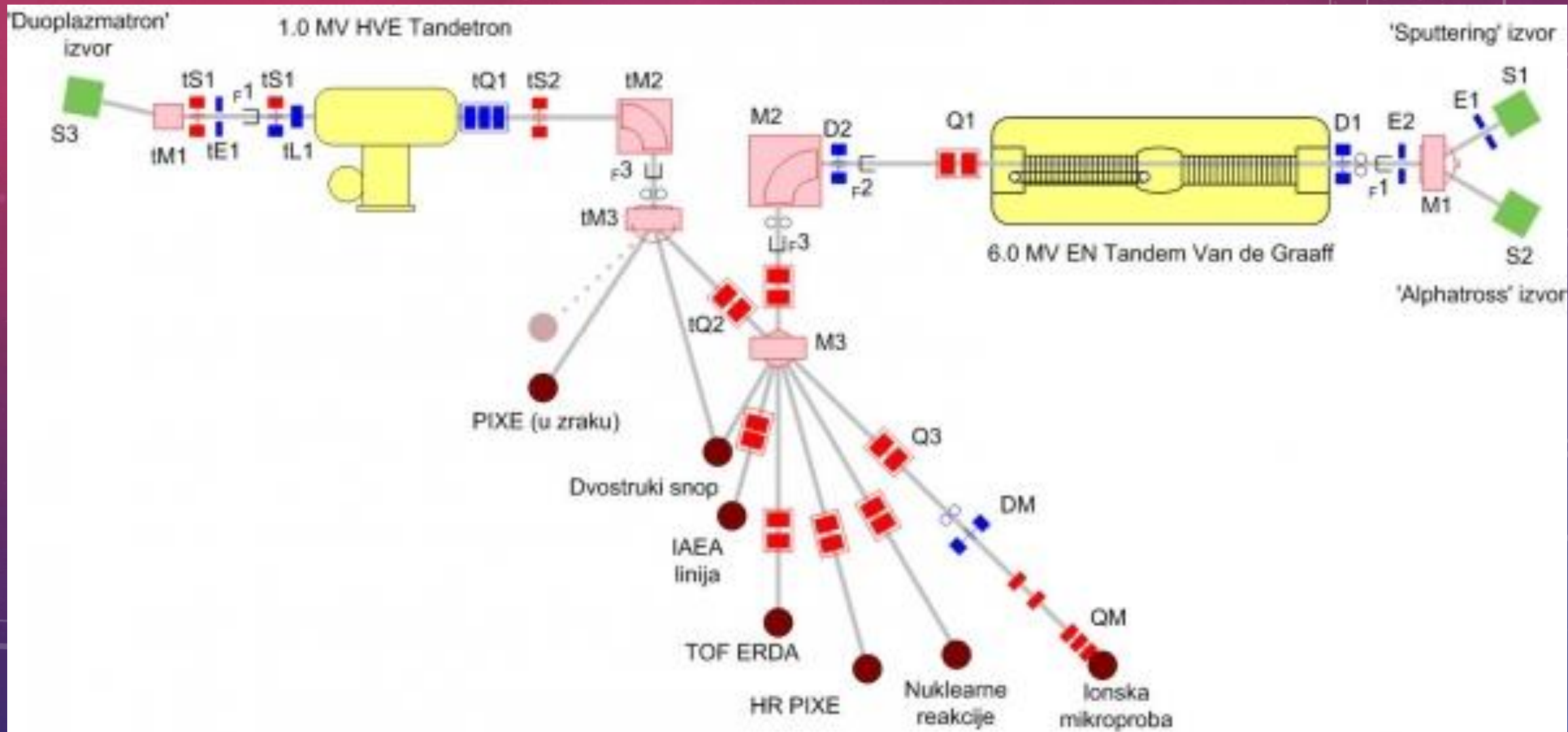
- Tip FD-7: 16x16x1.5 mm³

Element	Na	P	O	Al	Ag
mol%	11.0	31.5	51.2	6.1	0.2

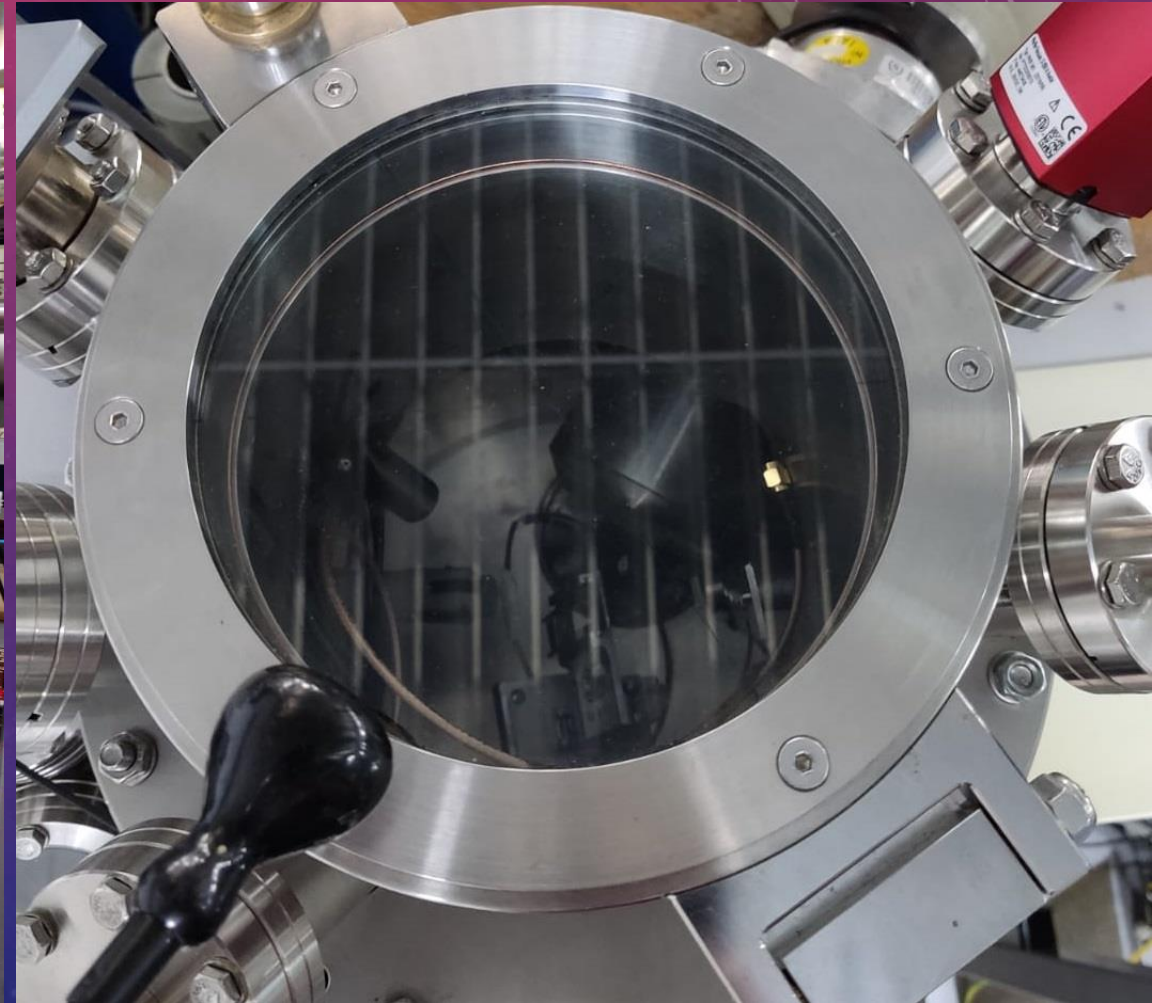
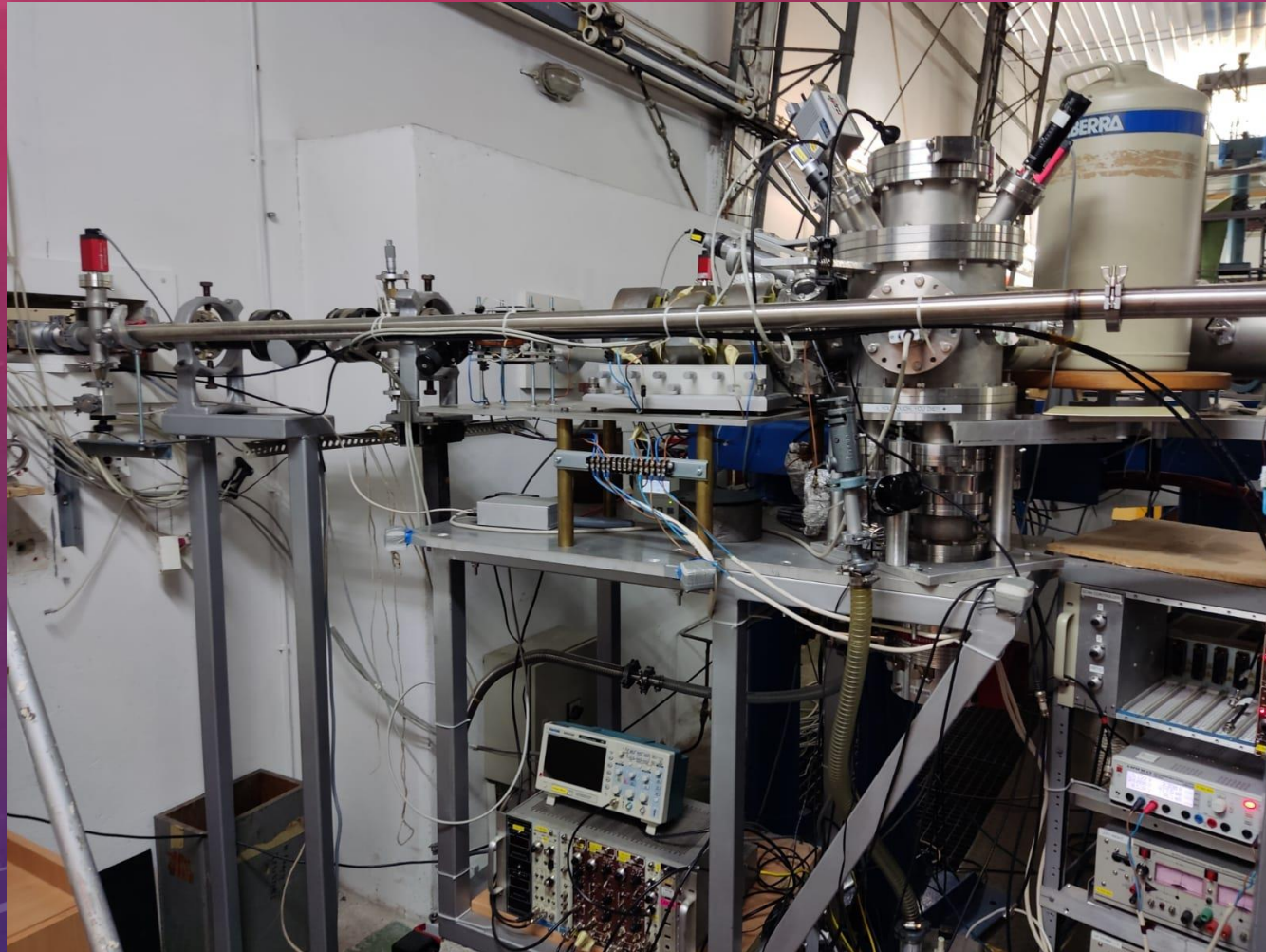
- SC-1
- FGD-202 čitač signala



EKSPERIMENTALNI POSTAV I OBRADA PODATAKA



EKSPERIMENTALNI POSTAV I OBRADA PODATAKA



IZRAČUN APSORBIRANE DOZE

$$D = \frac{NE}{m}$$

$$m = \rho AR$$

Gustoća vode je $\rho = 1 \frac{\text{g}}{\text{cm}^3}$, gustoća RPL stakla je $\rho = 2.61 \frac{\text{g}}{\text{cm}^3}$

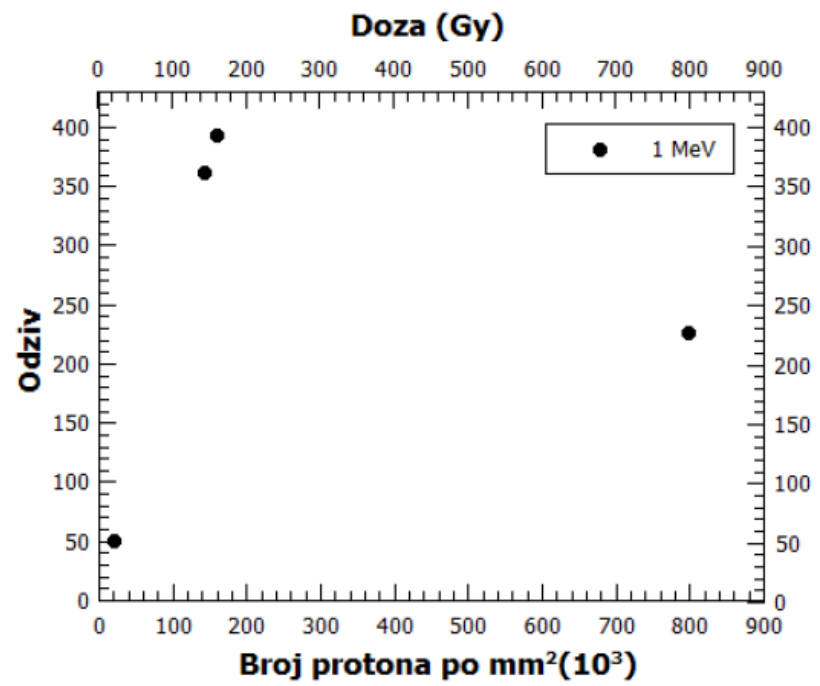
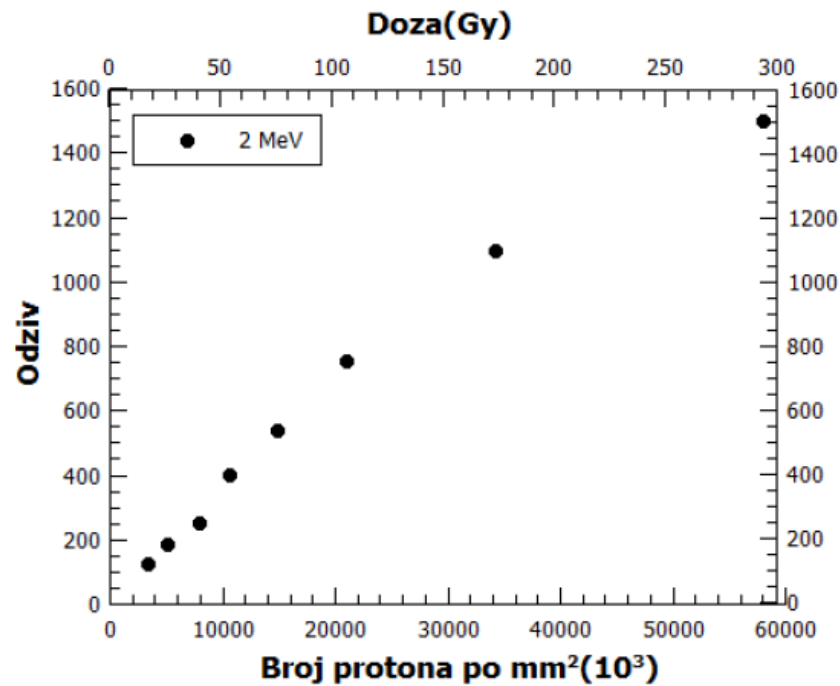
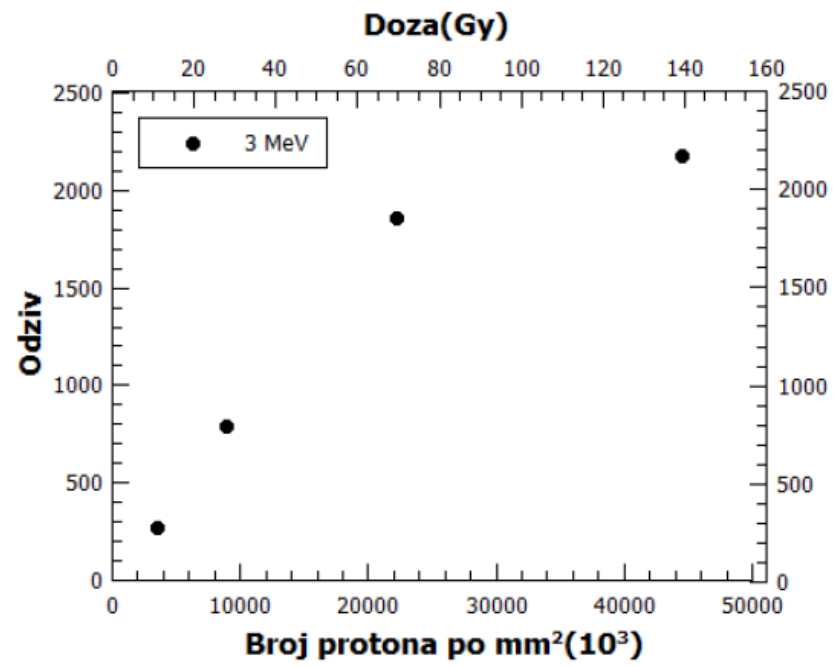
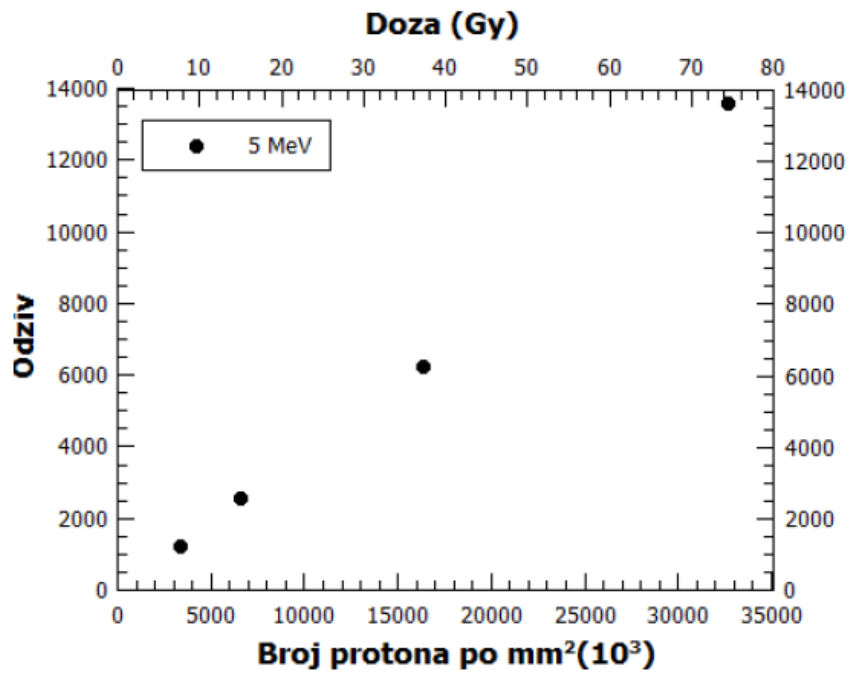
Stopping and Range of Ions in Matter (SRIM)

Voda:

$E[\text{MeV}]$	1	2	3	5
$R[\mu\text{m}]$	25.10	74.64	146.17	352.05

RPL staklo:

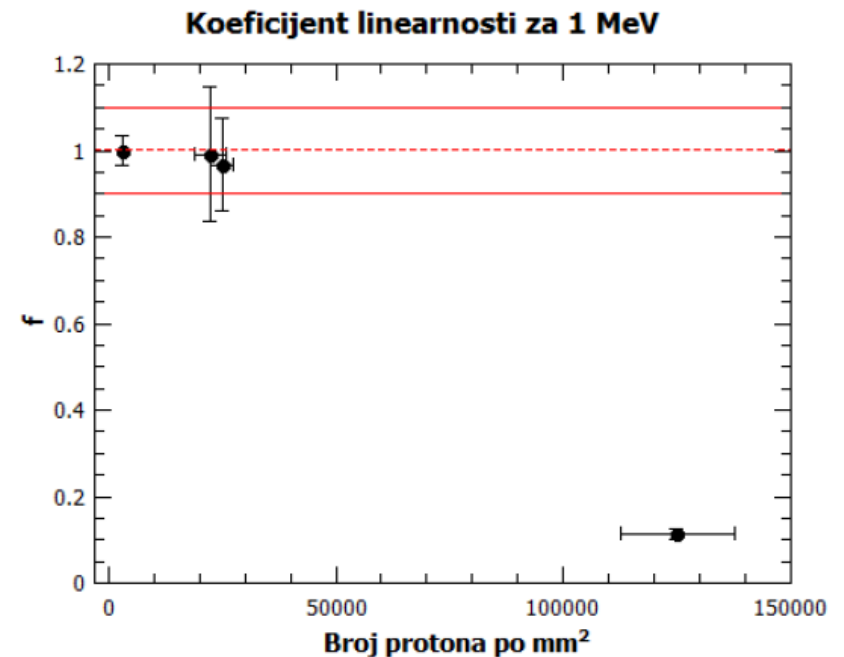
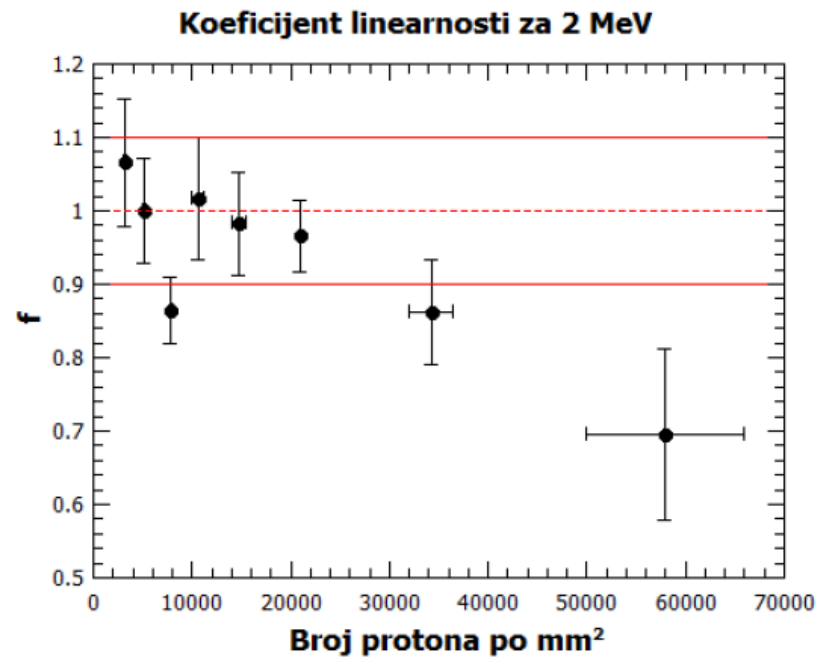
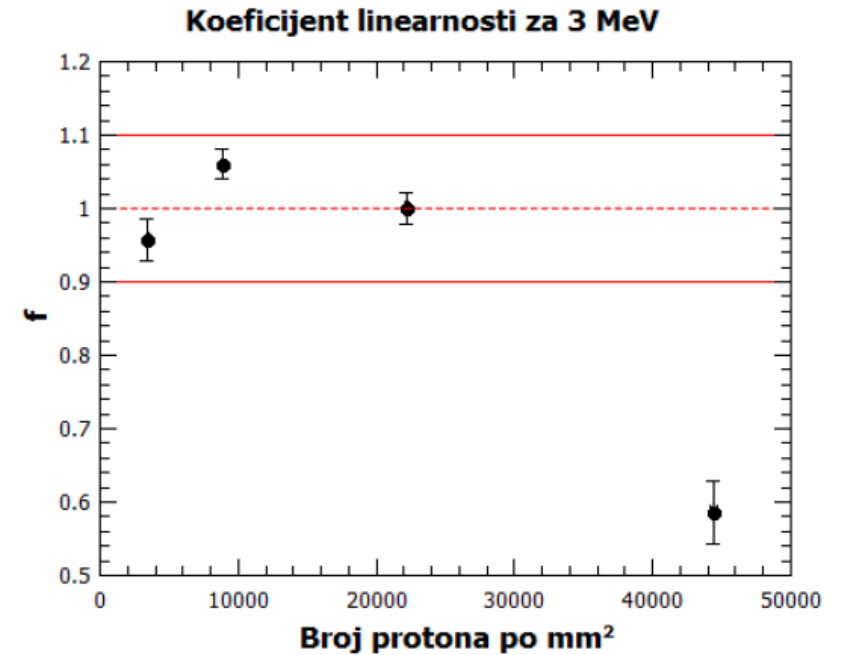
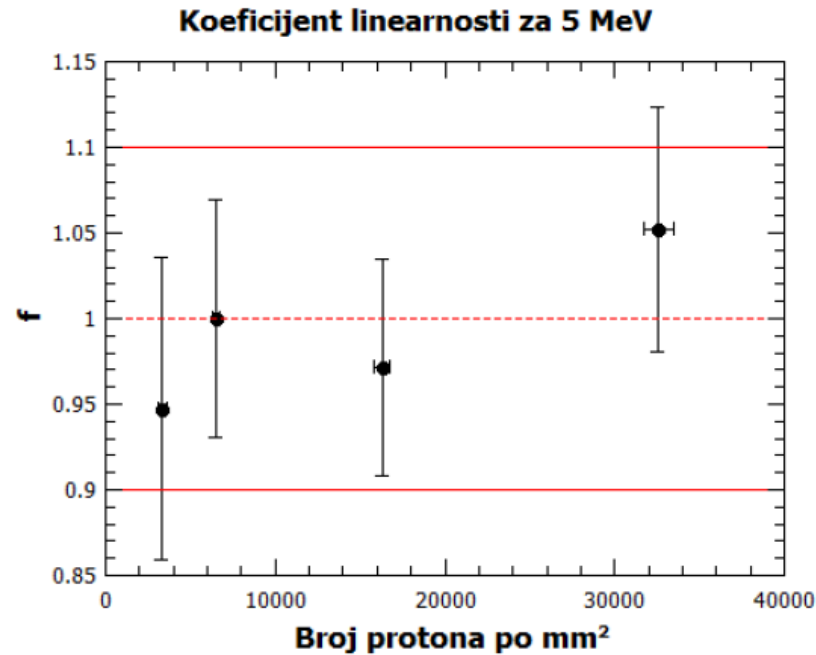
$E[\text{MeV}]$	1	2	3	5
$R[\mu\text{m}]$	13.67	40.07	77.54	183.05

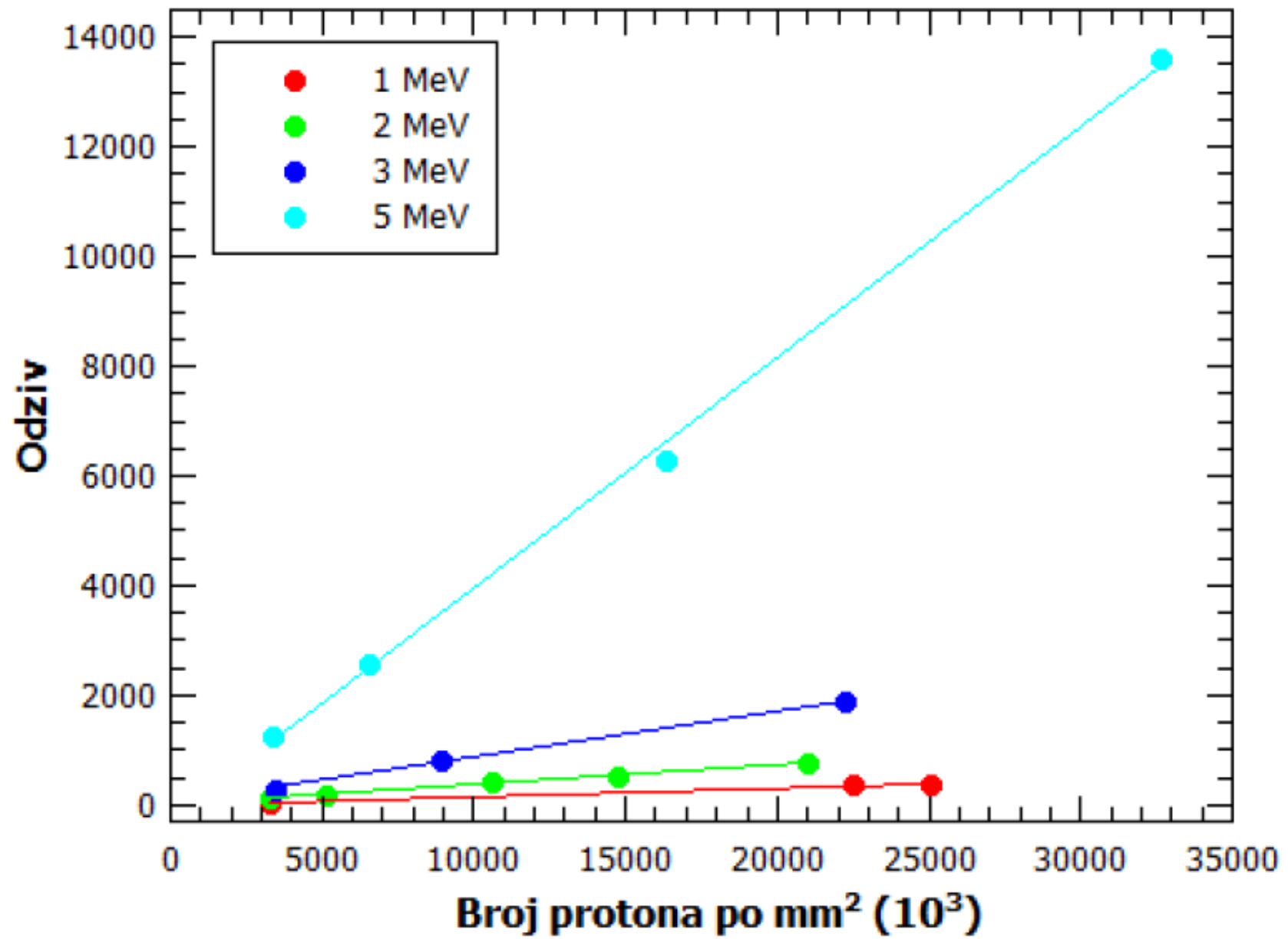


- Koeficijent linearnosti

$$f = \frac{\frac{I}{N}}{\frac{I_0}{N_0}}$$

- Linearno područje: 0.9-1.1
- Sublinearnost
- Nepouzdanosti



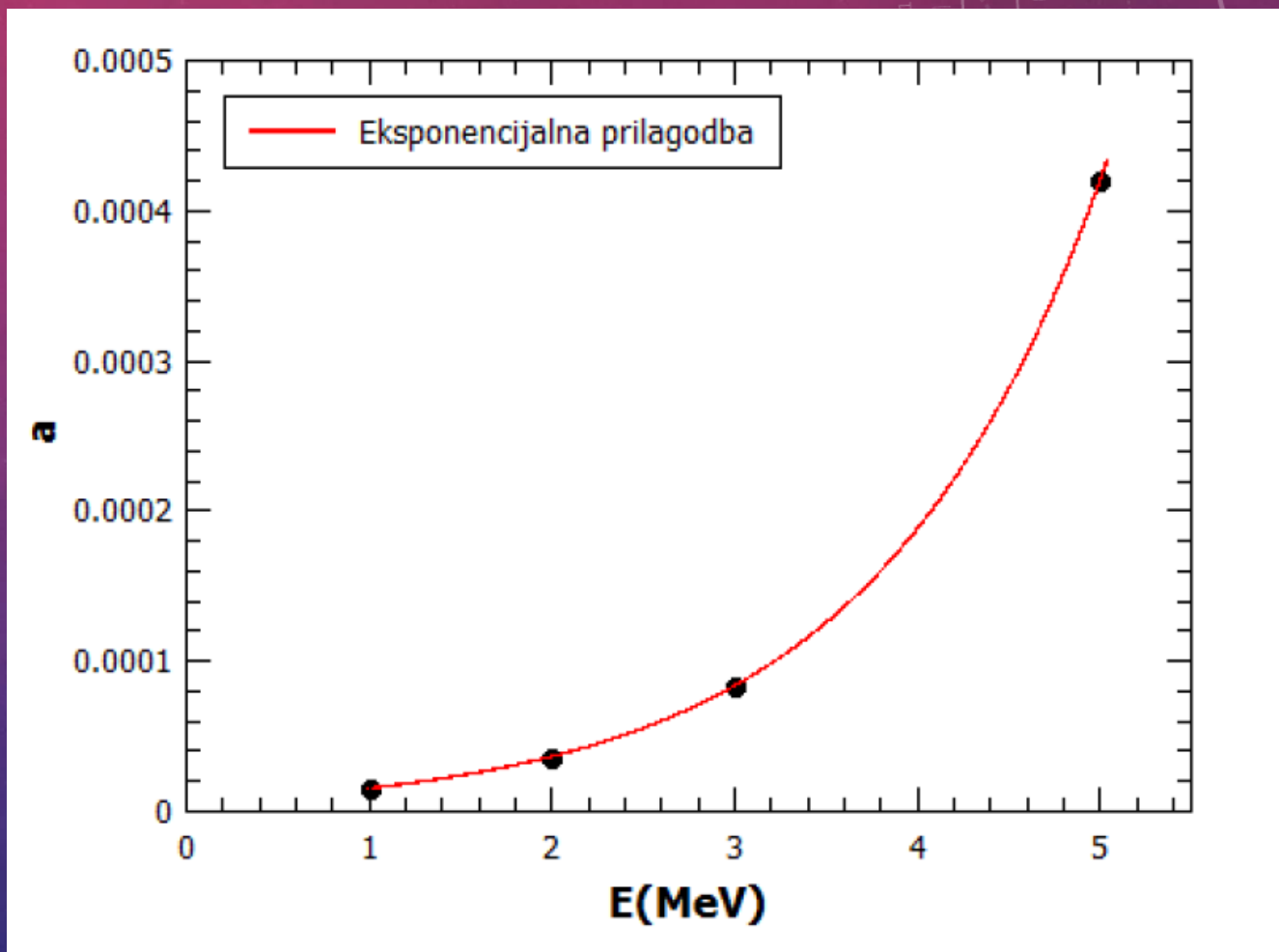


E[MeV]	a [mm ²]	M _a [mm ²]	R ²
1	0.0158	0.0004	0.9994
2	0.0361	0.0008	0.9990
3	0.084	0.003	0.9986
5	0.42	0.01	0.9984

$$Ae^{E/\tau}$$

$$A = (7.8 \pm 0.3)10^{-6}$$

$$\tau = (1.26 \pm 0.01) \text{ MeV}$$



ZAKLJUČAK

- Linearna ovisnost odziva dozimetra i doze do određene doze
- Odziv ovisi o energiji:
 - veće energije --> veći nagib pravca (veća učinkovitost dozimetra)
- a-E krivulja sugerira eksponencijalnu ovisnost

HVALA NA PAŽNJI!