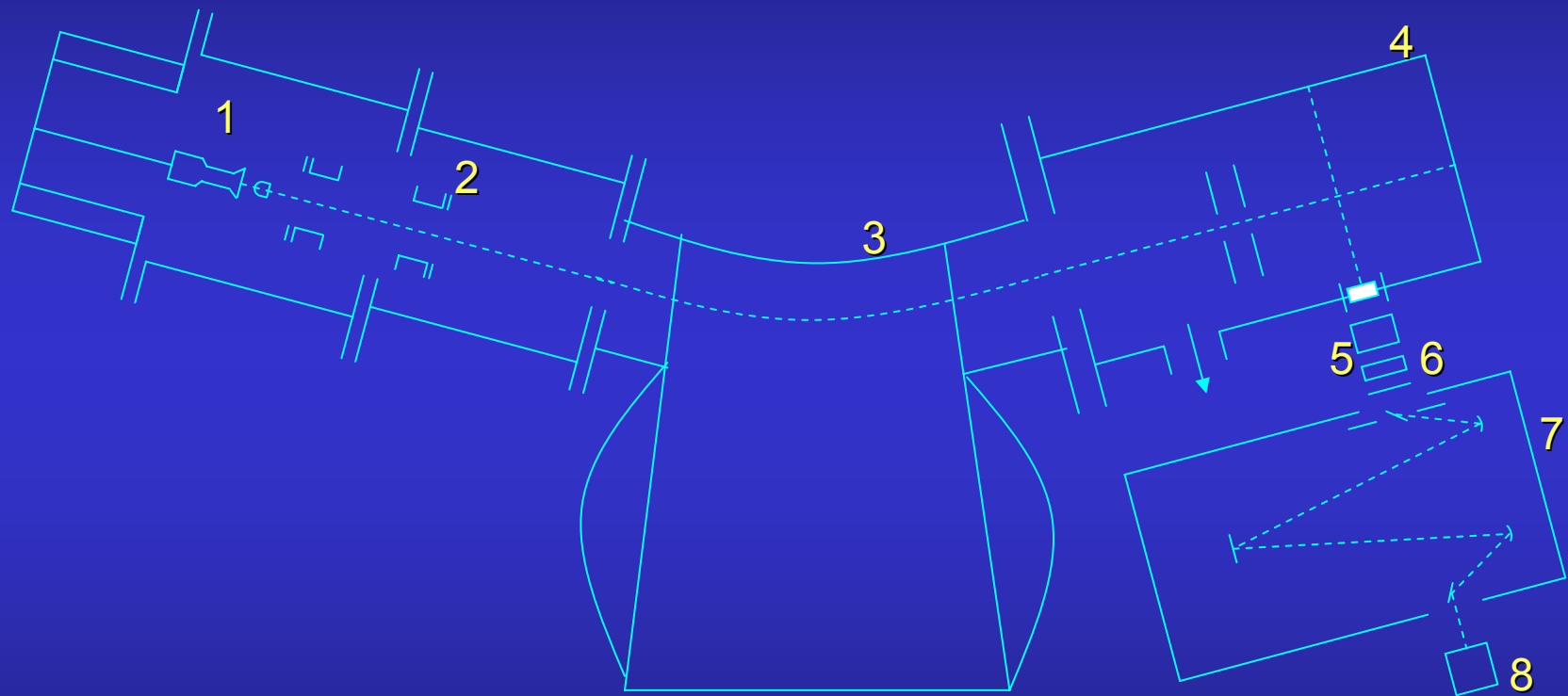


Polarization measurements in the He⁺ - N₂ collisions

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1.ion source 2.optical system 3.mass analyzer 4. collision chamber
5.polarizer 6.phase plate 7.monochromator 8.photomultiplier

HeI ($\lambda=388.9\text{nm}$)

NII ($\lambda=500.5\text{nm}$)

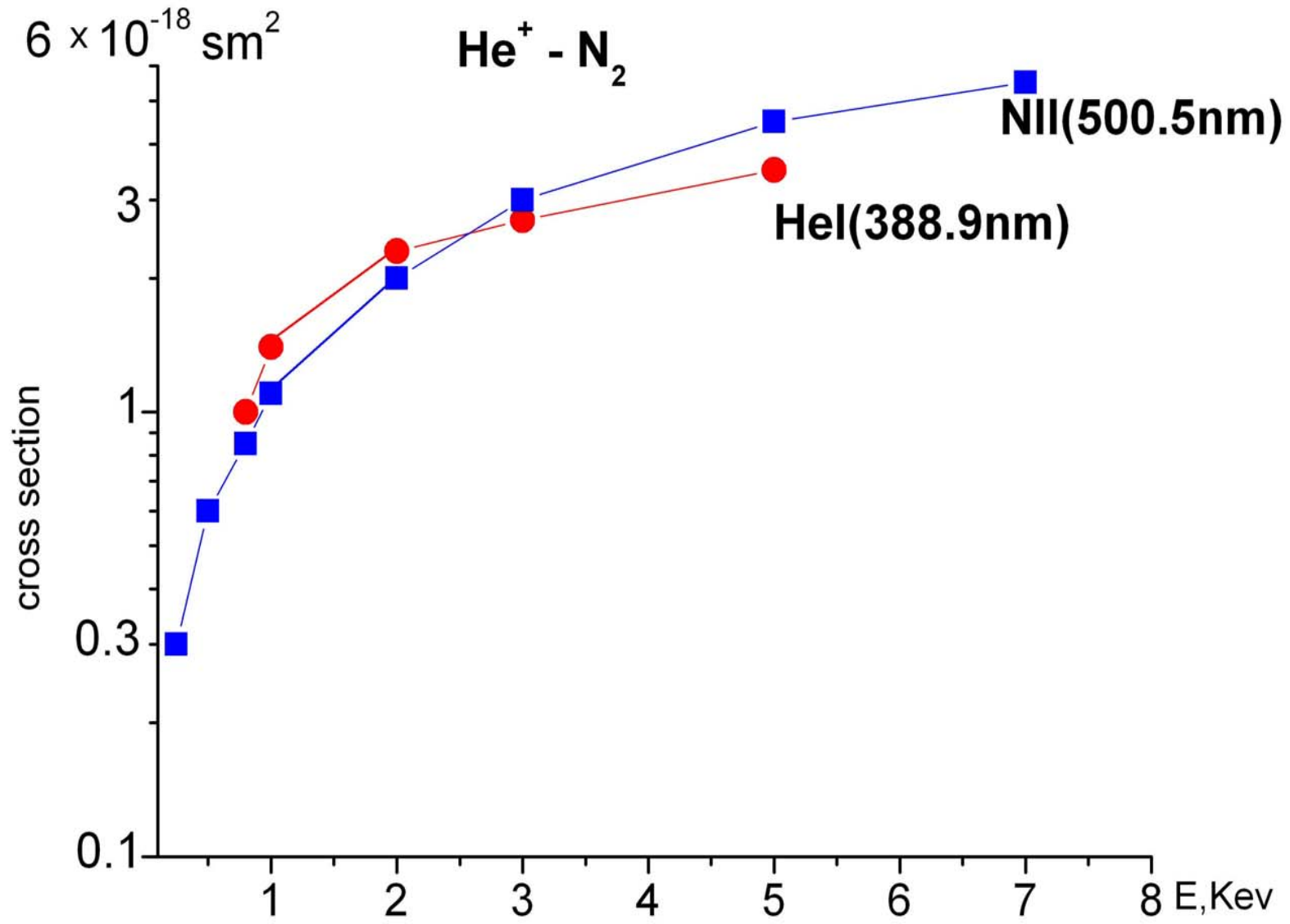


Fig.1 Energy dependence of the excitation cross section of helium atomic and nitrogen ionic lines

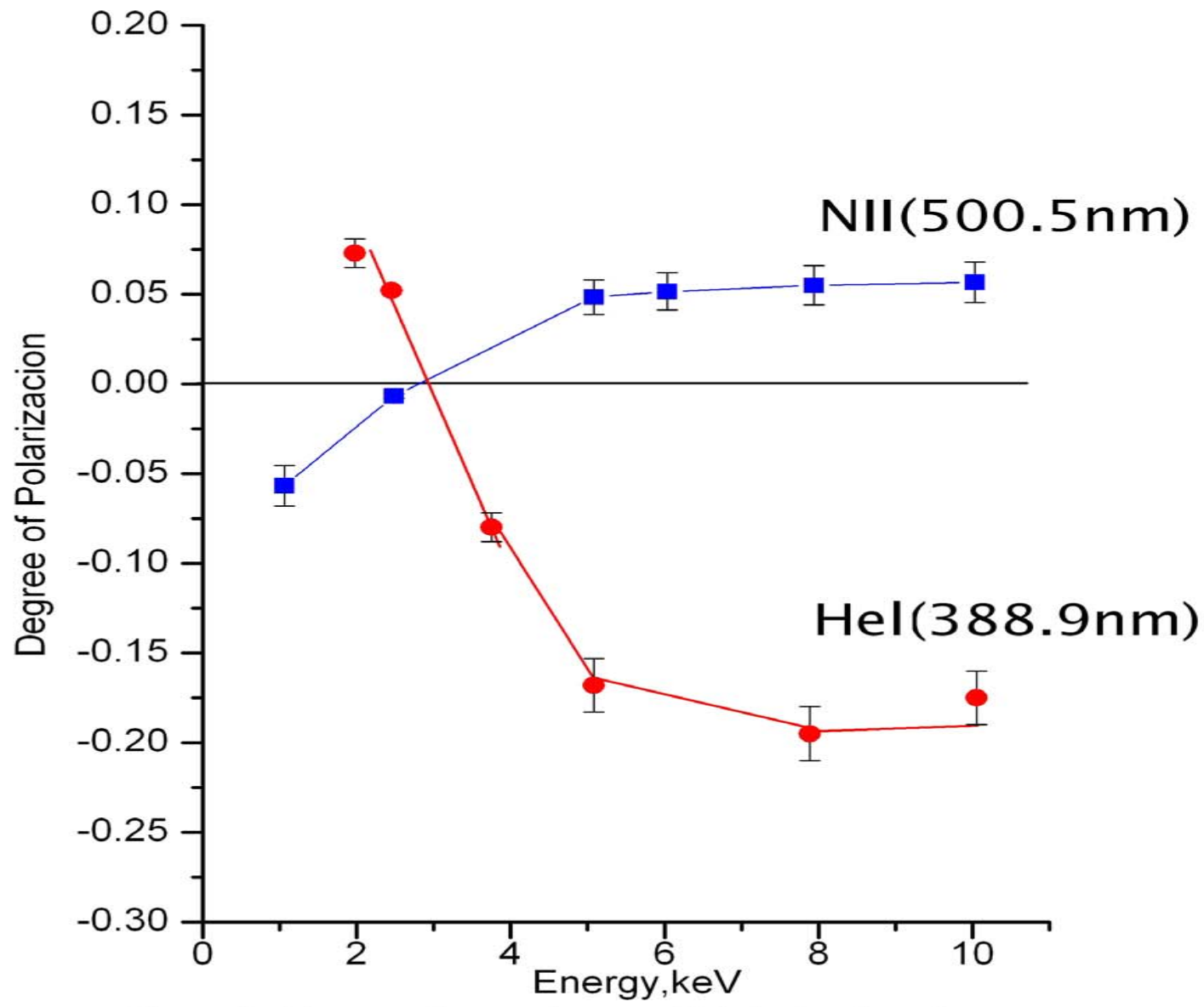
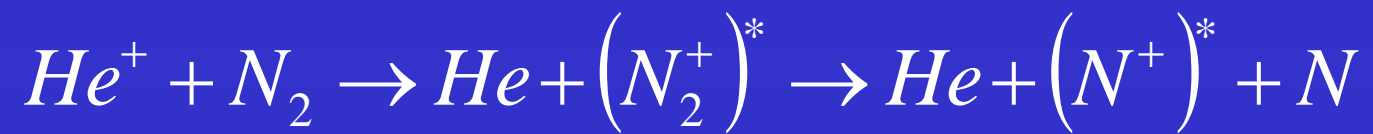


Figure2: Energy dependence of Polarization degree



Polarization of the emission emerging from excited 3P-state of helium is connected to the relative populations of magnetic sublevels 0 and ± 1

$$P = \frac{I_{\parallel} - I_{\perp}}{I_{\parallel} + I_{\perp}} = \frac{15(\sigma_0 - \sigma_1)}{41\sigma_0 + 61\sigma_1}$$

$$\frac{\sigma_1}{\sigma_0} \approx 15$$

$$m_L = \pm 1$$

For polarization of radiation emitted by nitrogen ion

$$P \approx \frac{\sigma_0 + 2\sigma_1 - 3\sigma_3}{3\sigma_0 + 6\sigma_1 + 6\sigma_2 + 5\sigma_3}$$

Summary

- Analysis of the experimental results indicates that the electron density formed in He* during the collision is oriented perpendicularly with respect to the incident beam direction
- Strong correlation is revealed between inelastic channels of the formation of excited helium and nitrogen particles

Thanks for attention