

## Charge changing and charge pick-up cross sections of 300 A MeV $\text{Fe}^{26+}$ ion beam in Al Target with new system

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In the present study, total, partial charge changing and charge pick-up cross-sections of 300 A MeV  $\text{Fe}^{26+}$  ion beam in aluminium target were calculated using a new system developed at National Institute of Technology, Kurukshetra. The CR39 nuclear track detectors were used to identify the incident charged particles and their fragments by using automatic image analysing system. The newly developed system will also be explained in the present work. CR39 detectors before and after the target were calibrated and found to have the same charge response and the values of charge resolution for both the detectors were 0.19e and 0.20e respectively. The response points were fitted by a polynomial of degree one and all the points are within the limits of experimental errors. The value of total charge changing cross-section was calculated to be . The total charge changing cross-section was compared with the experimental results of others and also fitted by Bradt-Peters theoretical geometrical cross-section. For calculating the partial charge changing cross-section for  $\Delta Z = -1, -2, -3, \dots, -23$ , the number of events corresponding to each fragment were counted from multiple Gaussian fitting of diameter distributions within 95.5% confidence levels and the number of incident and survived beam ions were counted within 99.7% confidence levels. Charge pick-up cross section for  $\Delta Z = +1$  was also calculated and came out to be  $(92 \pm 6)$  mb.