

Evaluating the best degrader thickness for the new ^7Li target in the boost side (target position 5)

Since the new TOFINO is thinner than the old one (0.18 cm compared to 0.23 cm), a simulation to evaluate the need of a new degrader to be positioned just before the ^7Li target in position 5 (occupied in the previous data taking by a ^{12}C target) has been performed.

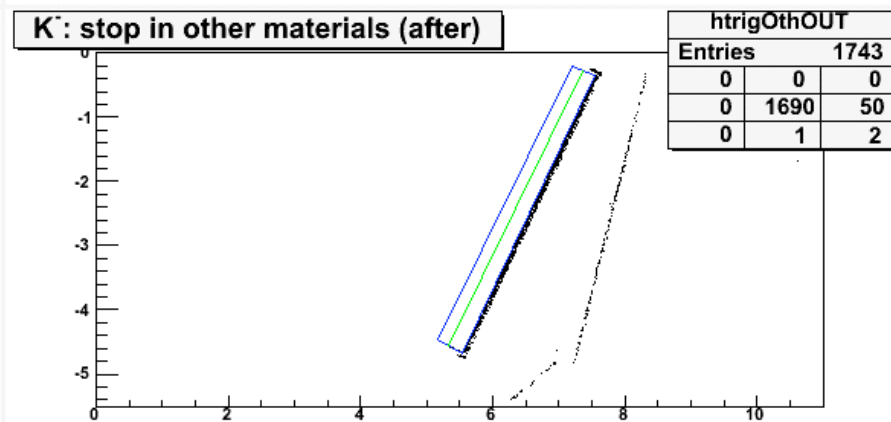
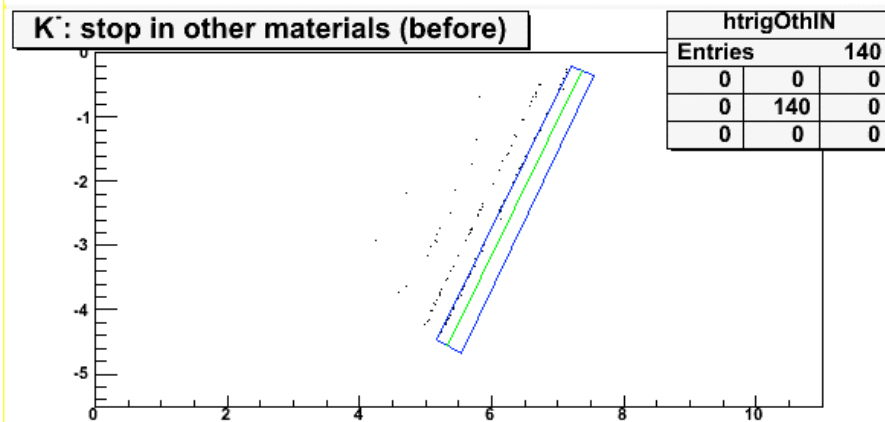
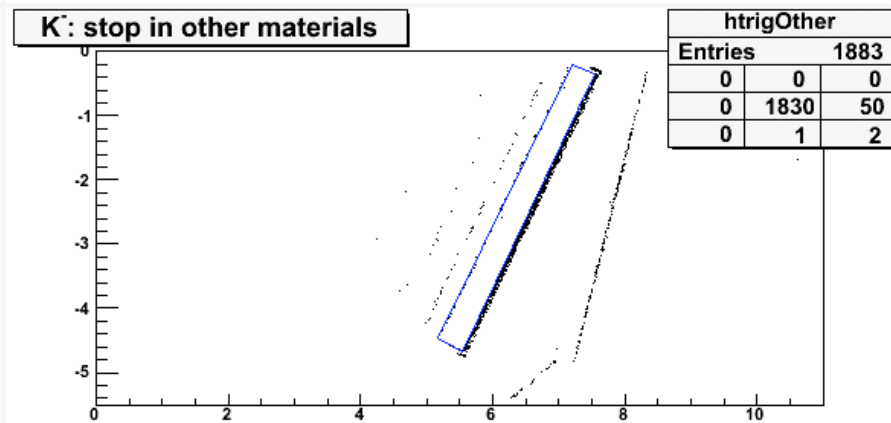
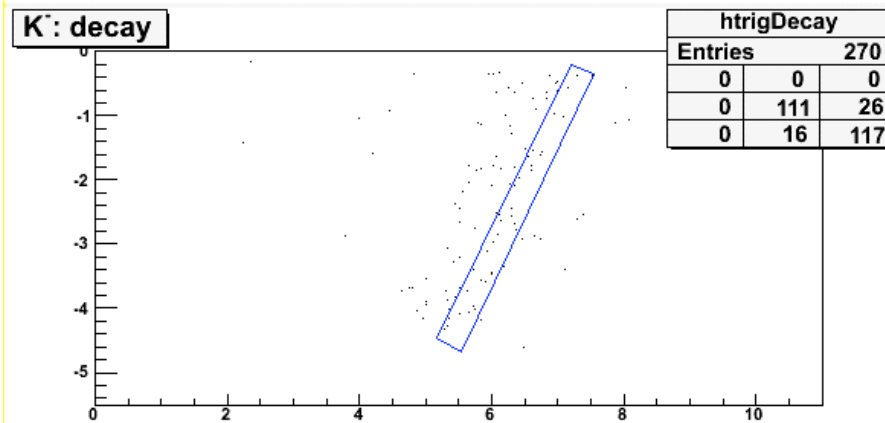
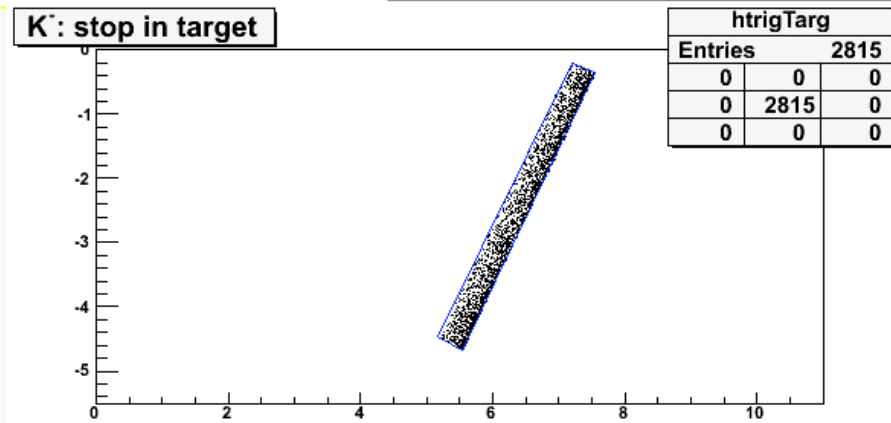
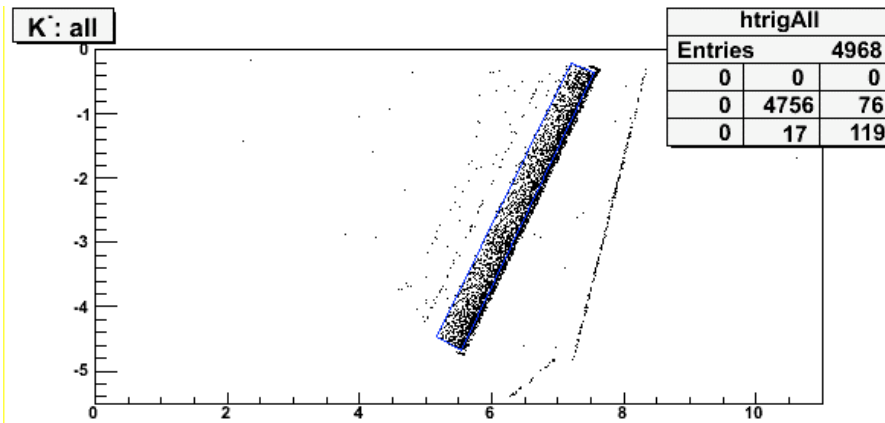
The MC geometry of the experiment has been modified to place the ^7Li target in the correct position, and different Mylar degrading foil thicknesses have been considered and simulated.

To evaluate the best thickness, the number of K^- stopped in target has been counted.

Clearly an increase of the degrader foil caused a decrease of the K^- stopped after the target (that is, K^- s that crossed the target and stopped inside the target external frame or inside OSIM) and an increase of the K^- stopped before the target (that is, K^- s that stopped mainly inside the target internal frame or inside ISIM). The trigger has been simulated requiring back-to-back signals in the TOFINO slabs.

The decay vertex in the (x,y) plane for three different conditions (no degrader, 350 μm and 600 μm degrader thickness) are shown in Fig.1-3.

The behaviour of the number of K^- stopped in target as a function of the degrader thickness is shown in Fig. 4.



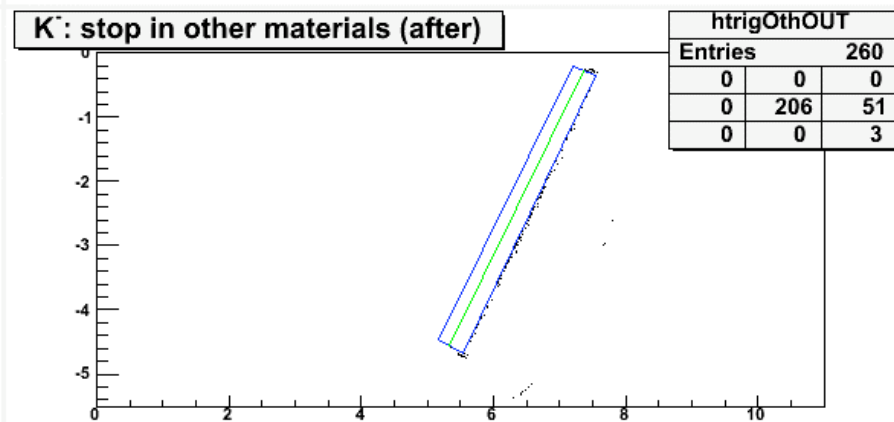
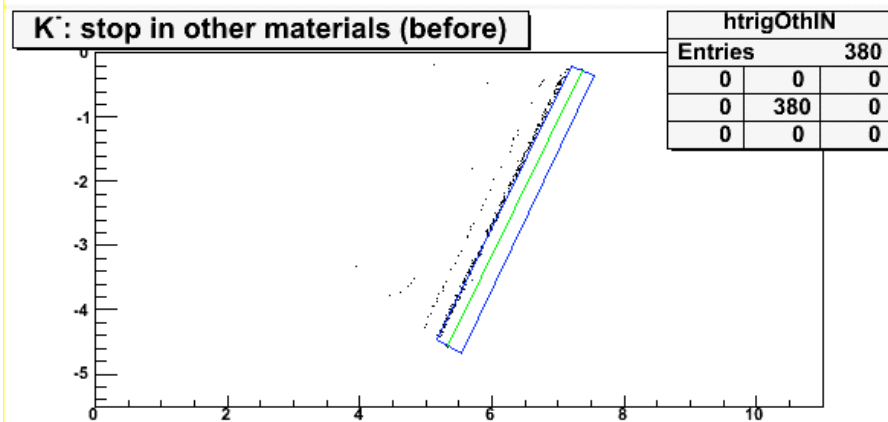
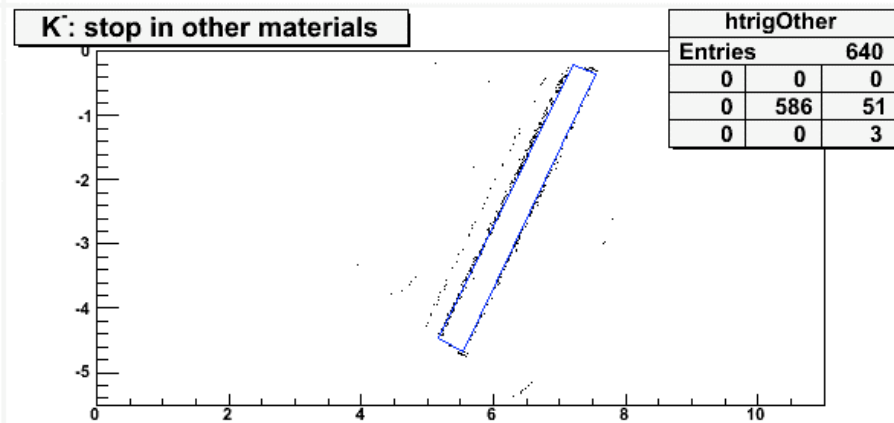
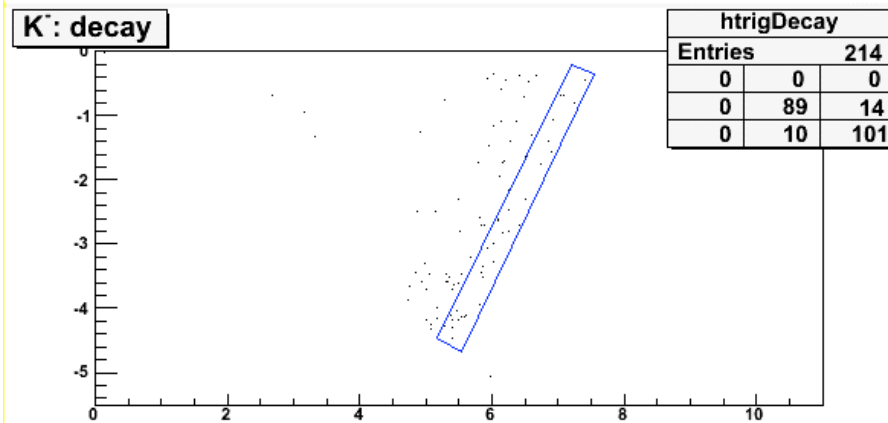
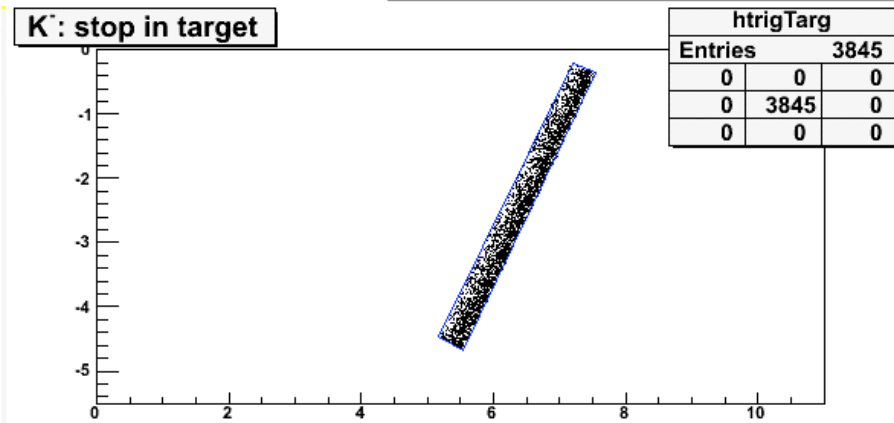
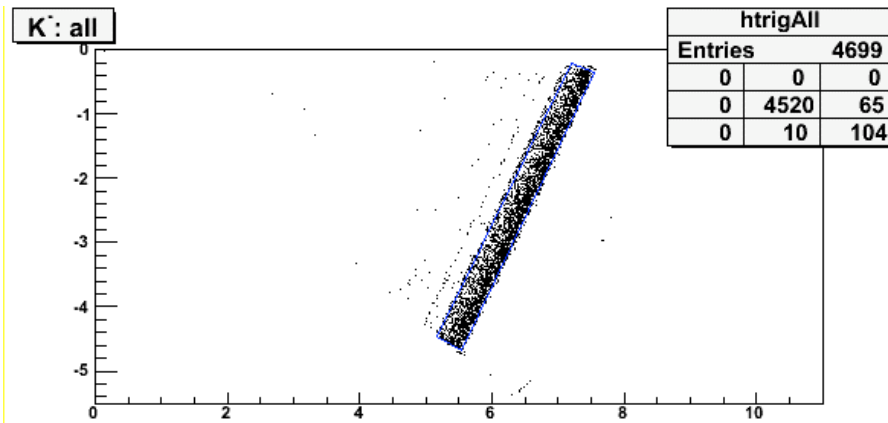


Fig. 2: K⁻ stop vertex (x,y) with 350 μm thickness degrader

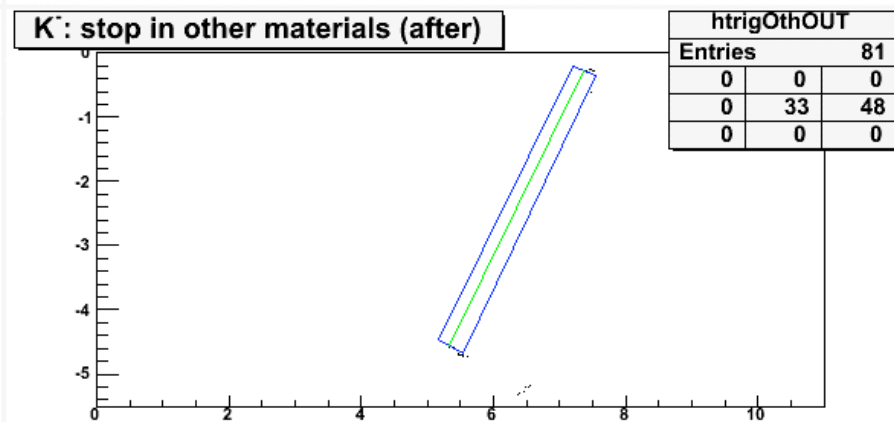
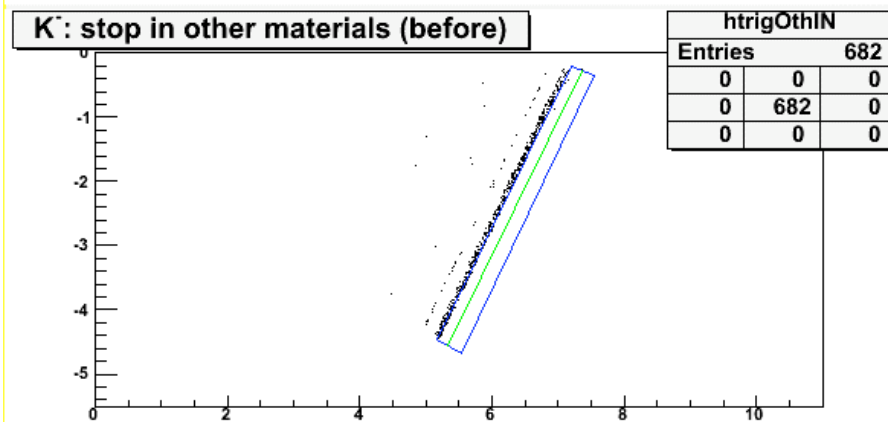
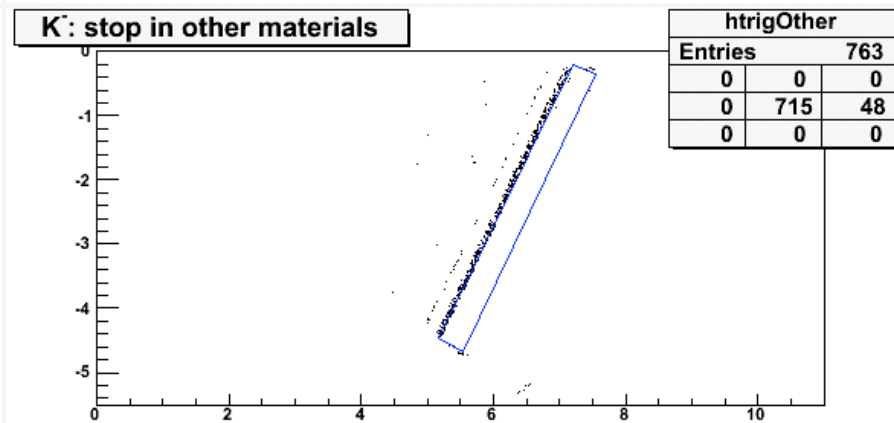
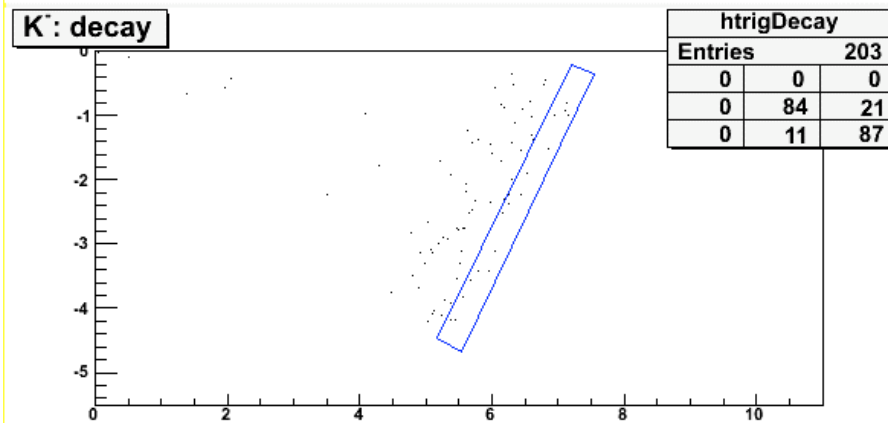
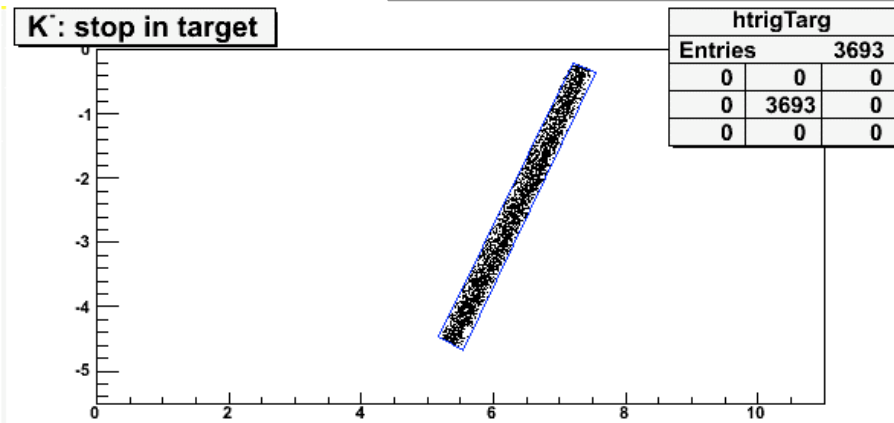
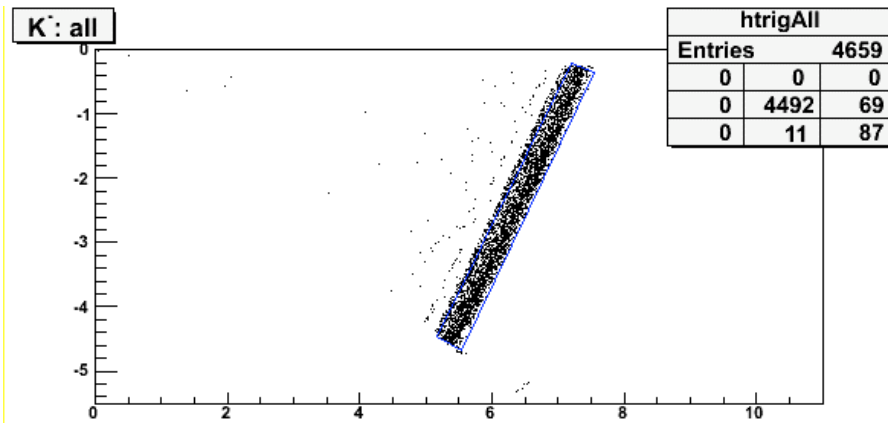


Fig. 3: K⁻ stop vertex (x,y) with 600 μm thickness degrader

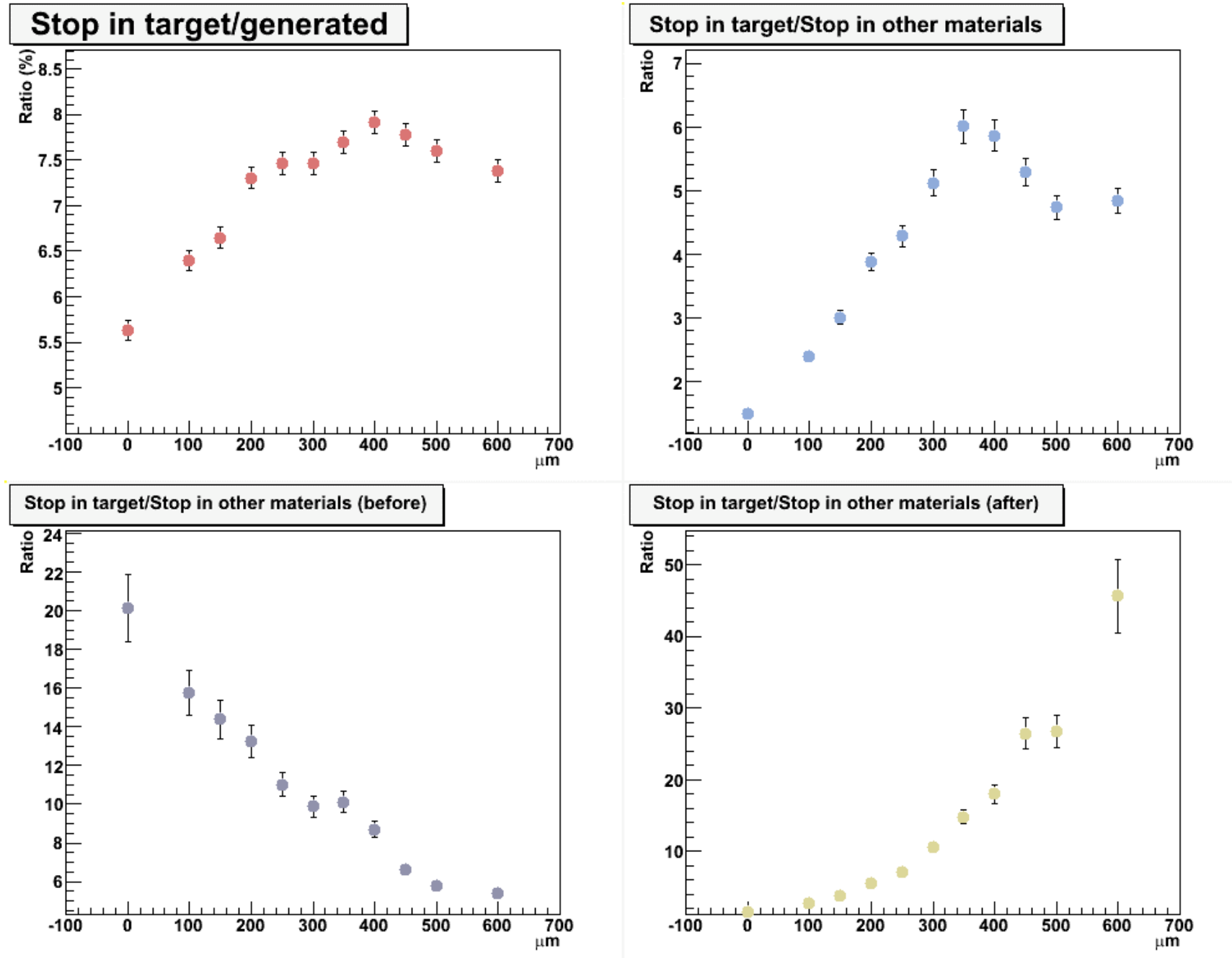


Fig. 4: K- stop in target as a function of the degrader thickness

Conclusions

According to our Montecarlo a Mylar degrader of 350-400 μm of thickness maximizes the number of K⁻ stopped inside the ⁷Li target positioned in the boost side (position 5).

This result would be more sound if our Montecarlo would have been validated with a comparison with real data. Nevertheless it proved to be quite reliable given the results of the previous data taking.