SUPPLEMETARY INFORMATION

ION MANIPULATIONS IN STRUCTURES FOR LOSSLESS ION MANIPULATIONS (SLIM): COMPUTATIONAL EVALUATION OF A 90^{o} TURN AND A SWITCH

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Figure S1

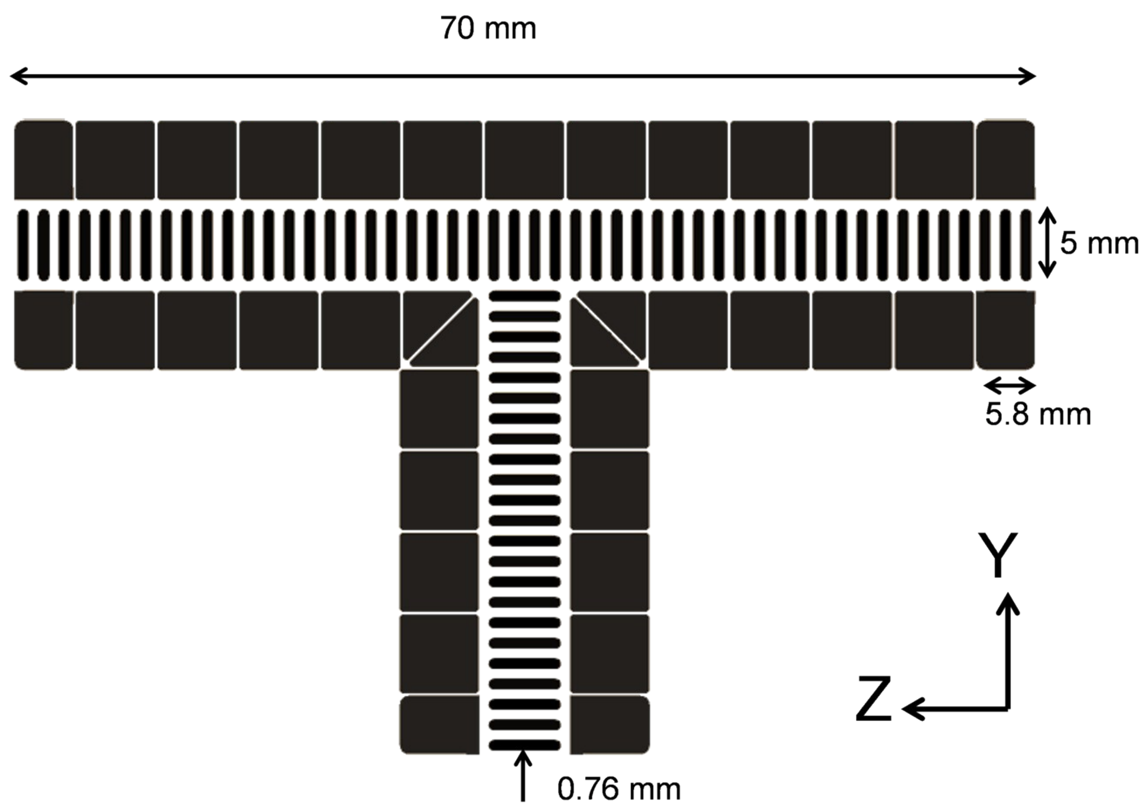

Figure S1: SLIM tee component electrode design. Two SLIM PCB-constructed boards are arranged parallel to each other, to form a single unit of tee. The straight tee units (discussed elsewhere[1, 2]) can be used in conjunction with tee to form flight paths of required dimensions.

Figure S2

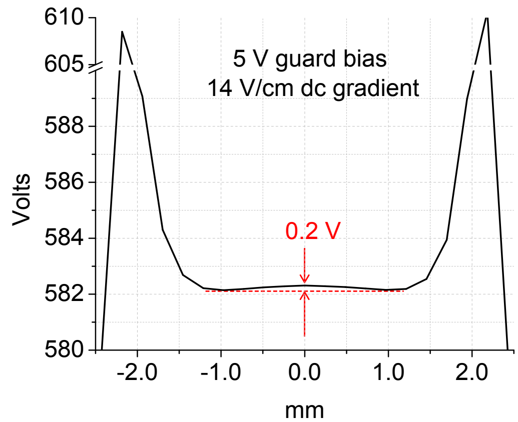

Figure S2: At 14 V/cm gradient and 5 V guard bias, the potential minima occurs at X = +/- 1.43 mm from each board (or ~1.0 mm from center axis between the boards). The inter-board gap is 4.85 mm.

Figure S3

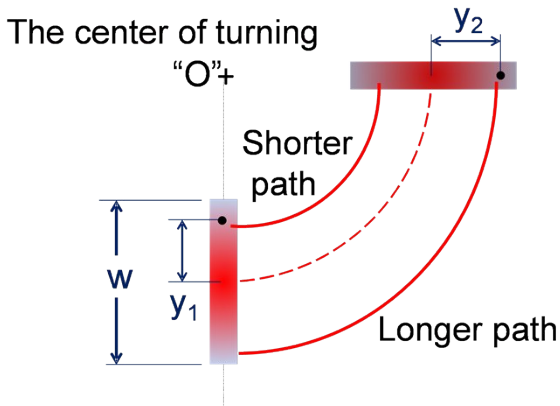

Figure S3: Ion beam (marked in gradient of red color) of width w turning through 90 degrees. The ions father away from the turning center traverse a longer path and take longer time, whereas the ions closer to the turning center take a shorter time. This results in an increase in the standard deviation of the arrival time distribution of the peak after the turn, which is being referred to as the “race track” effect.

Figure S4

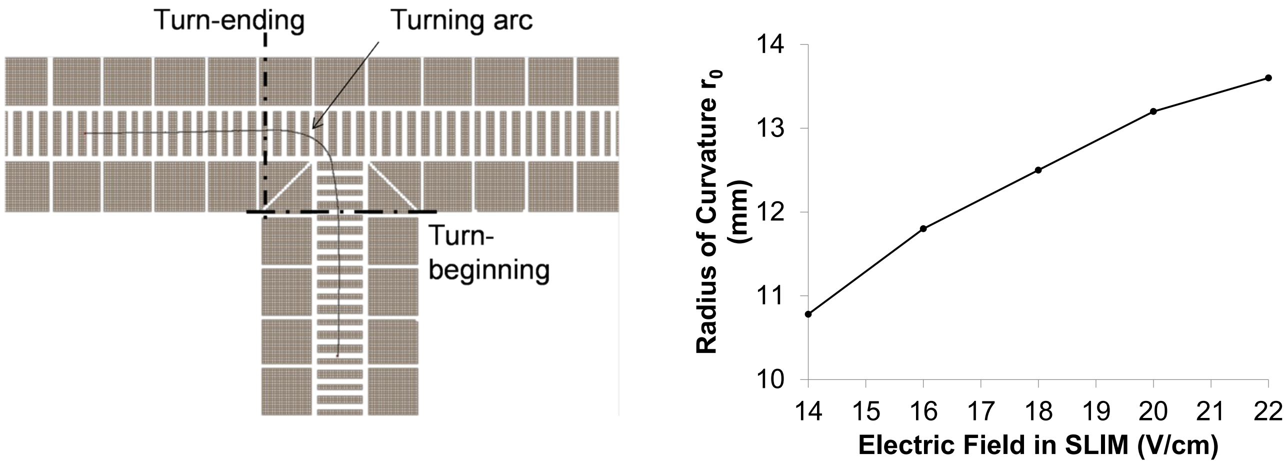

Figure S4. Left panel shows the averaged ion trajectory (excluding Brownian motion) in the SLIM tee at 10 V guard bias and 14 V/cm drift field, indicating the point of beginning and ending of the turn. Right panel shows the radius of curvature of the turning arc for different drift fields at 10 V guard bias. These radii values were used in the theoretical expression to evaluate the theoretical resolving power obtained during an ion turn at different drift fields.

Figure S5

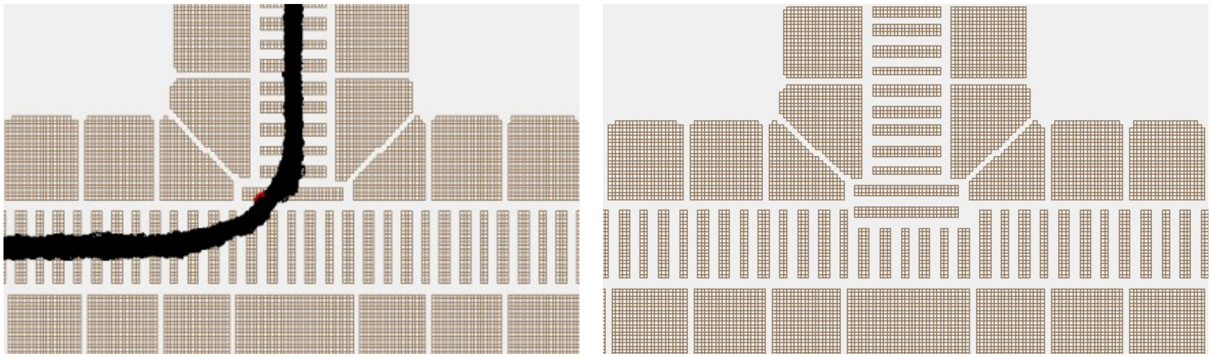

Figure S5: Left panel shows the elongated electrode design and right panel shows the elongated and insert electrode design

REFERENECS

[1] I.K. Webb, S.V.B. Garimella, A.V. Tolmachev, T.C. Chen, X.Y. Zhang, J.T. Cox, R.V. Norheim, S.A. Prost, B. LaMarche, G.A. Anderson, Y.M. Ibrahim, R.D. Smith, Mobility-Resolved Ion Selection in Uniform Drift Field Ion Mobility Spectrometry/Mass Spectrometry: Dynamic Switching in Structures for Lossless Ion Manipulations, Anal Chem, 86 (2014) 9632-9637.

[2] I.K. Webb, S.V.B. Garimella, A.V. Tolmachev, T.C. Chen, X.Y. Zhang, R.V. Norheim, S.A. Prost, B. LaMarche, G.A. Anderson, Y.M. Ibrahim, R.D. Smith, Experimental Evaluation and Optimization of Structures for Loss less Ion Manipulations for Ion Mobility Spectrometry with Time-of-Flight Mass Spectrometry, Anal Chem, 86 (2014) 9169-9176.