# AbstractID: 7712 Title: Pitfalls in electron dose assessment by Monte Carlo radiation transport codes

**Purpose: The idea of this work is to show that along with Monte Carlo based transport codes growing simulation capabilities which led them to turn into an interesting working tool in treatment dose assessment, a good understanding of their working structures becomes more difficult and a correct reading of their output may become troublesome.**

**Method and Materials: MCNP is used to calculate the Percentage Depth Dose (PDD) of a set of monoenergetic electron beams impinging on a water phantom. For each beam energy, simulations are performed for the same problem specification except for an increased sequence of individual changes (electron energy indexing algorithm, energy cutoff, voxel size and tally specification). Tallied results are further compared to stress the role played by different parameters. EGSnrc is also used to simulate the same problem so to compare the results from different codes.**

**Results: PDDs tallied for the standard energy indexing algorithm show a more penetrating beam with a steadier fall off than those calculated using the ITS mode, presenting distinct clinical parameters while energy cutoff may stand as an important strategy to speed-up simulations presenting no statistical difference for proper choices( ~20 times, for 200keV).**
**Voxel size and tally specification - dose assessment through mean average flux (F4) rather than by energy distribution (*F8) - although not so influencing as the energy indexing mode, also play their roles on PDP shaping.**
**A comparison between MCNP and EGS show differences particularly in the build-up region.**

**Conclusion: This work demonstrates that a correct simulation transcends the proper description of the simulation system, and reliable and precise results are not obtained just by focusing on geometric and composition details. Some increments in computation facility which may lead to an expectation a refinement in dose assessment may turn to be a cumbersome hurdle.**