FEATURES OF MCNP5 RELEVANT TO MEDICAL RADIATION PHYSICS

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ABSTRACT

MCNP (Monte Carlo N-Particle) is a general-purpose Monte Carlo code for simulating the

transport of neutrons, photons, electrons, and positrons. Over many years, MCNP has found a

wide range of applications in many different fields, including medical radiation physics. In

this presentation we will describe and illustrate a number of significant recently-developed

features in the current version of the code, MCNP5, having particular utility for medical

physics. Among these are major extensions of the ability to simulate large, complex

geometries, improvement in memory requirements and speed for large lattices, introduction

of mesh-based isotopic reaction tallies, advances in radiography simulation, expanded

variance-reduction capabilities, especially for pulse-height tallies, and certain small but

important enhancements in the condensed-history treatment of electron transport. We will

demonstrate the use of some of these features in practical calculations.

We shall also present a brief report on the status of the next version of the code, MCNP6,

which is being developed to replace MCNP5 and MCNPX, and will contain all of the features

of both codes.