1116-92-1065 **Erin N. Bodine*** (boinee@rhodes.edu), Rhodes College, 2000 N. Parkway, Memphis, TN 38112, and **K. Lars Monia**. *A Model of Proton Therapy using Discrete Diffusion.*

Proton therapy is a type of radiation therapy used in the treatment of cancer. It is advantageous over other types of radiotherapy (e.g., x-ray and electron) in that proton therapy provides more localized particle exposure significantly reducing damage to tissue outside the target area which in turn reduces unwanted side effects. We have developed a discrete difference equation patch model with discrete diffusion to simulate tumor growth over one-dimensional space, where each patch represents tissue at a particular depth below the skin's surface. We use a clinical solution approximation of the Bethe-Bloch formula to simulate the dose exposure at each depth during a single proton treatment session in the absence of any other types of therapy. To demonstrate the utility of the model, we parameterize it using data from in vitro and clinical studies of Hepatocellular carcinoma. Using the parameterized model, we compare the results of treatment courses (multiple treatments sessions) used in clinical practice where two of the treatment courses use conformal proton therapy which targets the tumor from multiple angles. Our results suggest that conformal proton therapy provides better control of the targeted tumor and should be recommended for use when feasible. (Received September 16, 2015)