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Breathing interplay effects during proton radiation therapy and development of repainting solutions¹ DANIEL ROBERTSON, Brigham Young University, Dept. of Physics & Astronomy, JOAO SECO, ALEXEI TROFIMOV, HARALD PAGANETTI, Massachusetts General Hospital, Dept. of Radiation Oncology — The movement from passive scattering to active spot scanning in proton radiation therapy introduces the problem of interplay effects when elements of beam motion have a similar time scale to periodic tumor motion, as in a lung tumor. This can lead to significant deviations from the planned radiation dose. Although the repetition of a field over many treatment sessions tends to average out these inhomogeneities, the usual 30 fractions may still leave sizeable errors. These errors are characterized via computer simulation, and field ‘repainting’ methods are developed to reduce them through increased dose averaging.

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