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RB-SIRT: capturing the dynamics of polyurethane foam under compression

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A conventional 4D computed tomography (CT) acquisition consists of several CT (sub) scans that are acquired sequentially. Conventionally, each sub scan is independently reconstructed. A straight forward method to improve the temporal resolution and reduce deformation artefacts the acquisition time of each sub scan can be shortened. However, this strategy results in low signal to noise ratio reconstructions and/or in under sampling artefacts. The proposed Registration Based SIRT algorithm allows lowering the acquisition time of the sub scans without compromising the reconstruction quality. This is achieved by introducing a motion model into the reconstruction process, which allows including projections of other time points into the reconstruction process without causing deformation artefacts. The method was validated on a 4DCT dataset of polyurethane foam under compression.

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