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## ABSTRACT

Data modelization in tomography is a key point for iterative reconstruction. The design of the projector starts with the representation of the object of interest, decomposed on a discrete basis of functions.

Standard models of projector such as ray driven [4], or more advanced models such as distance driven [1], use simple cubic voxels, which result in modelization errors due to their anisotropic behaviour. Moreover approximations made at the projection step increase these errors. Long, Fessler and Balter [2] reduce approximation errors by projecting the cubic voxels more accurately. However anisotropy errors still hold. Spherically symmetric volume elements (blobs) [6] eradicate them, but at the cost of increased complexity.

We propose a compromise between these two approaches by using B-splines as basis functions. Their quasi-isotropic behaviour allows to avoid projection inconsistencies, while conserving local influence [3] [8]. Small approximations transform the exact footprint (projection of the basis function) into a separable function, which does not depend on the angle of projection, and is easier and faster to integrate on detector pixels. We obtain a more accurate projector, with no additional computation cost.

## **1. THE MODEL**

A. Use of B-splines for image representation instead of cubic voxels



# **R1. APPROXIMATION ERRORS OF OUR MODEL COMPARED TO THE DISTANCE DRIVEN MODEL** [1] A. Parallel beam geometry Absolute value distance drive B-spline degree distance driv **B-spline degre** Evolution of errors of the B-spline degree



### REFERENCES

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