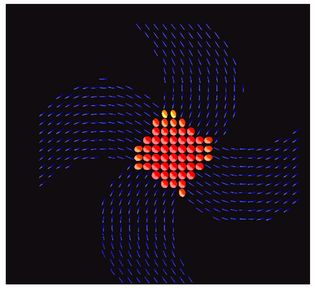
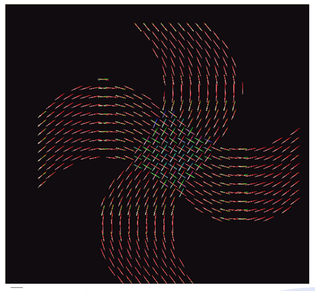
6 – Results in Synthetic Data, 4 measures, b=1000, N = 30.

- Comparison of the method performance in a simulated fiber crossing. The proposed method shows the better performance with lower angular error, ε.
- The spatial regularization smoothes the fiber trajectories in noisy data.

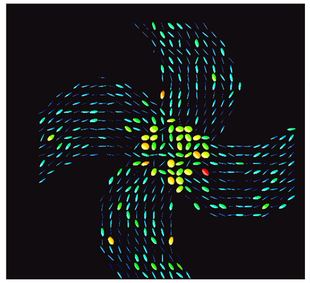
DT-MRI

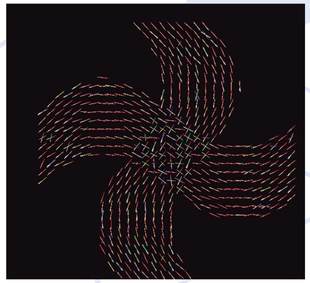


Multi Tensor

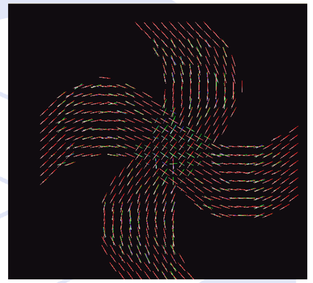


$\bar{e} = 1.48$



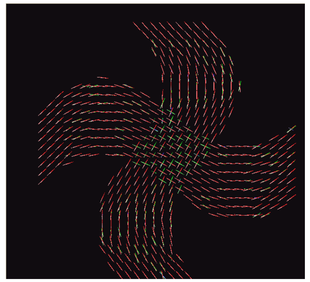


$\bar{e} = 4.49$



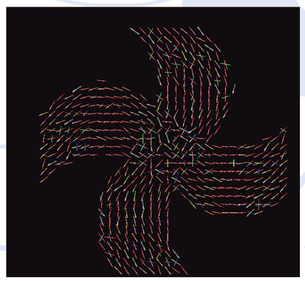
$\bar{e} = 2.29$

$l_s = 0.028, l_c = 0.002$

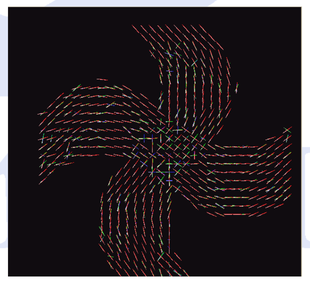


$\bar{e} = 6.42$

$l_s = 0.05, l_c = 0.009$

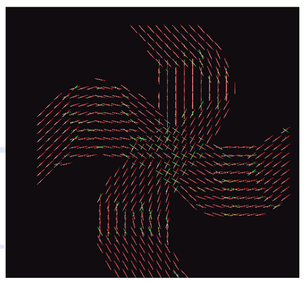


$\bar{e} = 6.69$



$\bar{e} = 4.68$

$l_s = 0.028, l_c = 0.002$



$\bar{e} = 6.85$

$l_s = 0.12, l_c = 0.009$

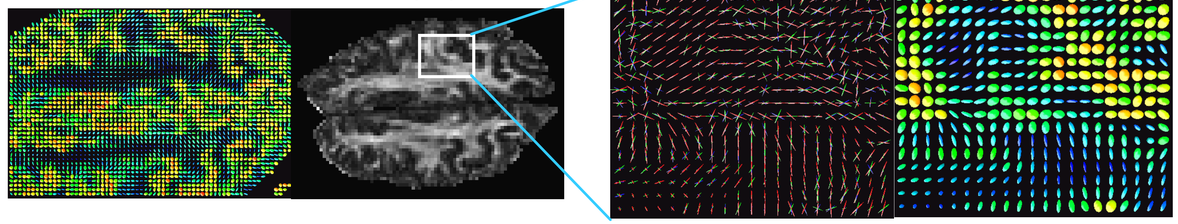
No Regularization

Regularization

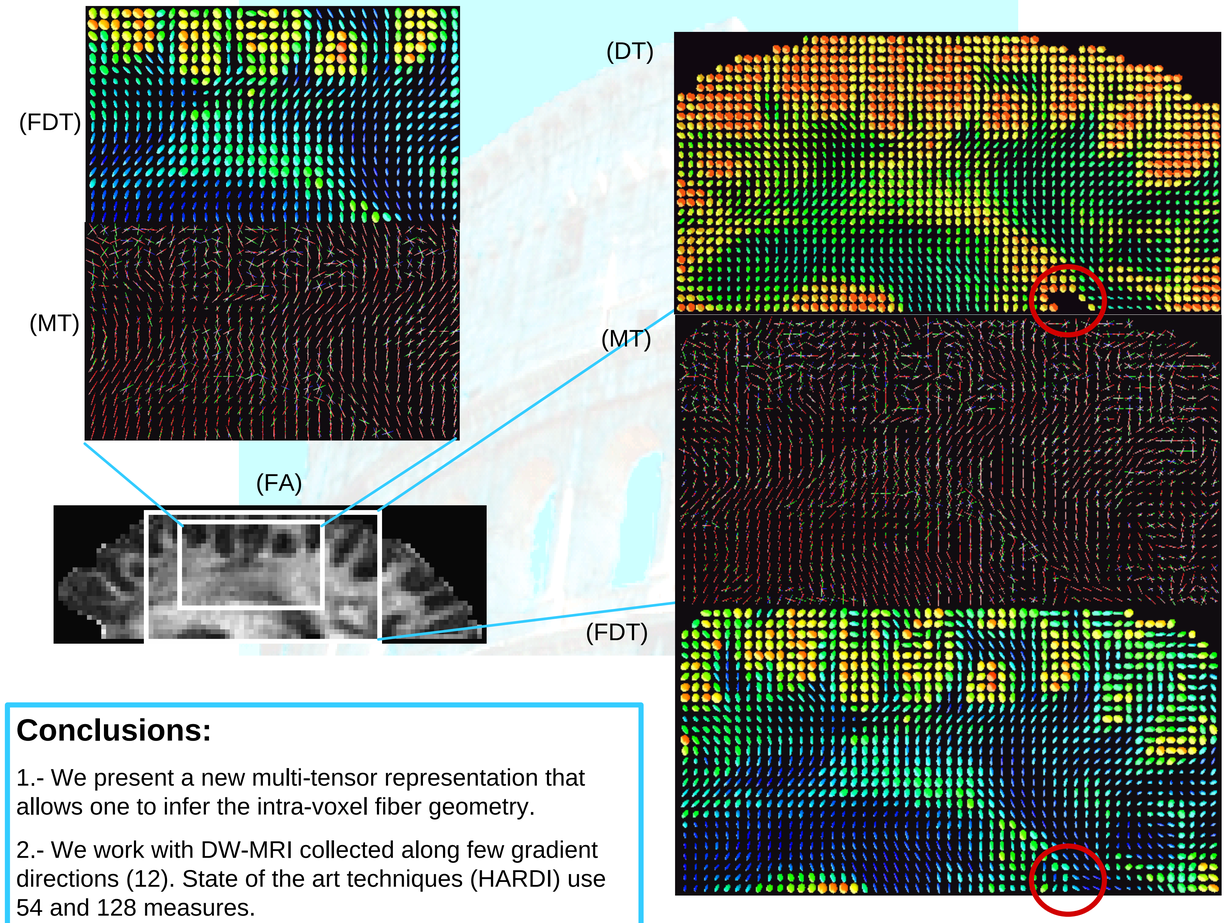
7- Results with DW-MRI data, 12 measures, b = 1000, N=33.

(FA) Fractional Anisotropy, (MT) Multi-Tensor, (DT) DT Least Squares, (FDT) $D^f = \sum_j^N a_{j,r} \bar{T}_j$

(FDT) (FA) (MT) (FDT)



(FDT) (MT) (FA) (DT) (MT) (FDT)



Conclusions:

1.- We present a new multi-tensor representation that allows one to infer the intra-voxel fiber geometry.

2.- We work with DW-MRI collected along few gradient directions (12). State of the art techniques (HARDI) use 54 and 128 measures.

3.- The method is simple and efficient: the DBF can be precomputed and the solution is obtained by solving a linear system (with a non-negativity constraint).

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