Testing Models of Multi-Component Diffusion and Spin Relaxation in Porous Media under Radio Frequency Excitation in NMR

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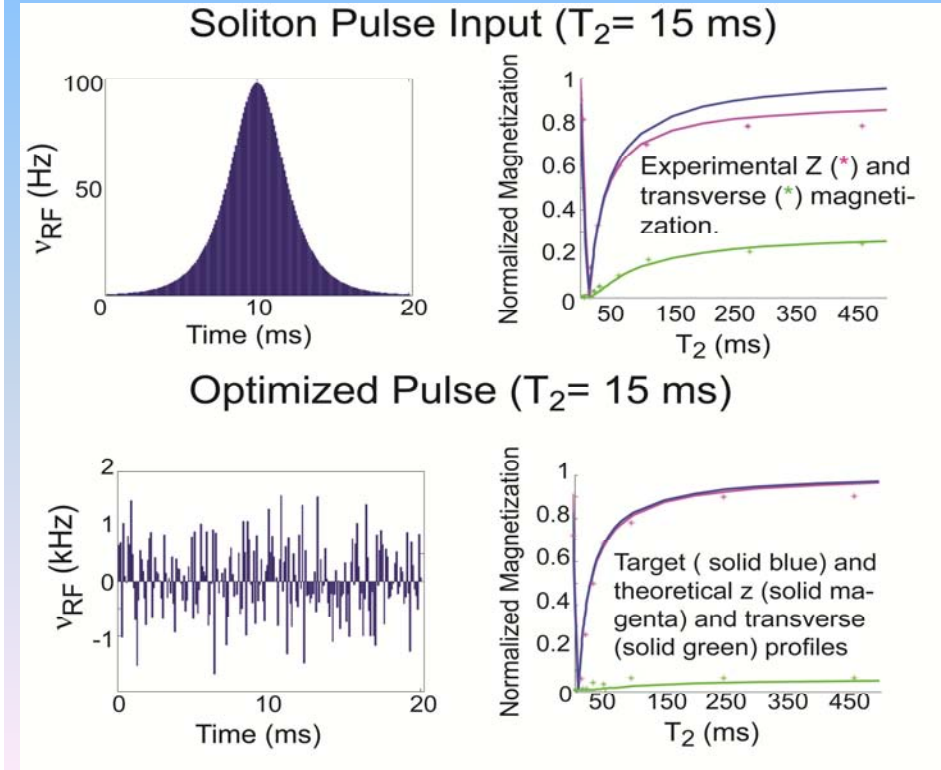
Design of Relaxation Selective Pulses

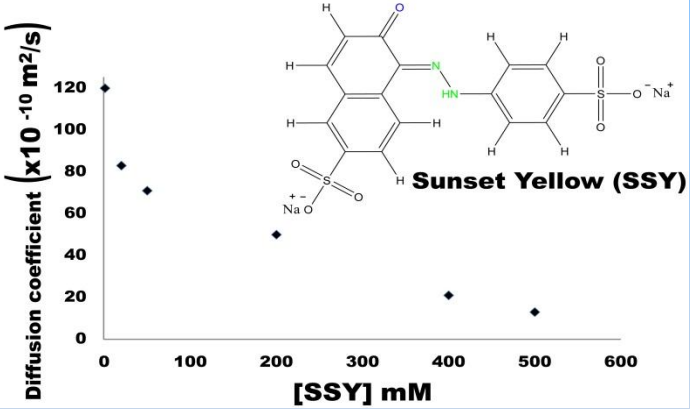
Optimal control theory were used to design RF pulses to selectively zero the magnetization for a given transverse relaxation time, T_2 as shown below for T_2=15 ms. Pulses are optimized to be robust to field inhomogeneieties. Besides applying these pulses to aslphaltene samples, will next use algorithms to design pulses to include time-dependent gradients for diffusion selectivity



Diffusion and Aggregation in Dyes

To develop sequences to constrain diffusion and aggregation models, we began by characterizing aggregation and diffusion in the well studied dye, sunset yellow (SSY), using NMR measurements of the spectral parameters (relaxation times, chemical shift changes , diffusion coefficients) vs. [SSY]

Diffusion vs. dye concentration.



^{1}H spectra vs. dye concentration.