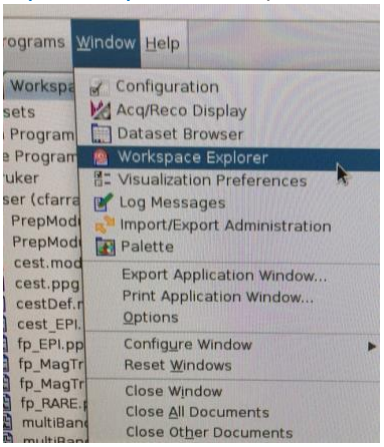
Bruker PV6 CEST MRF Pulse Sequence Method Installation Instructions

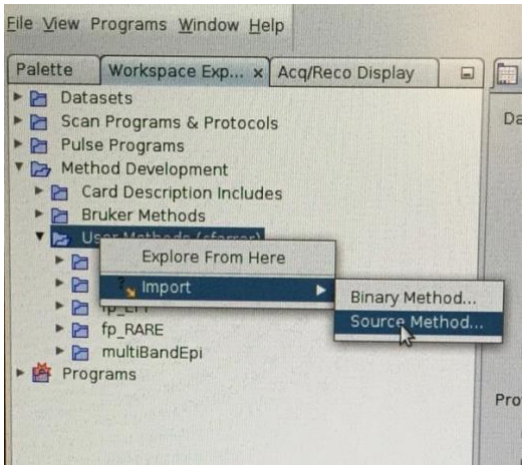
1. Copy the pulse sequence source code and the modified Magnetization Transfer pulse program module files to the /opt/PV6.0.1/share directory.
    - EPI-based sequence: cest_MRF_EPI_6.0.1.PvUserSrcMethod
    - RARE-based sequence: cest_MRF_RARE_6.0.1.PvUserSrcMethod
    - Mag Transfer module: fp_MagTrans_6.0.1.PvUserPulseProgram
    - Mag Transfer module: fp_MagTransOffsetDef_6.0.1.PvUserPulseProgram
    - Mag Transfer module: PrepModulesHead_fp2_6.0.1.PvUserPulseProgram

2. Copy the MRF acquisition schedule text files to a folder in your home directory
    - Amide proton schedule: amide.txt
    - Semi-solid proton schedule: MT.txt
    - The first line of the acquisition schedule is the total number of MRF iterations. The following lines of the acquisition schedule are the TR, Saturation Power, Saturation Frequency Offset, Excitation Flip Angle, and Saturation Pulse Length for each iteration.
    - An unsaturated reference image is usually acquired for the first iteration of the acquisition schedule.

3. Import the pulse sequence into PV6
    - Open PV6 and open the Workspace Explorer tab (Windows → Workspace Explorer)

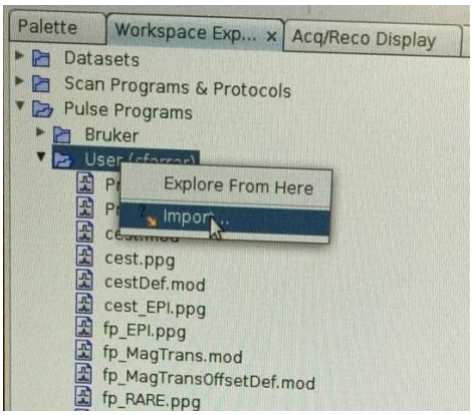


    - Go to Method Development folder, right click on User Methods, and select Import → Source Method

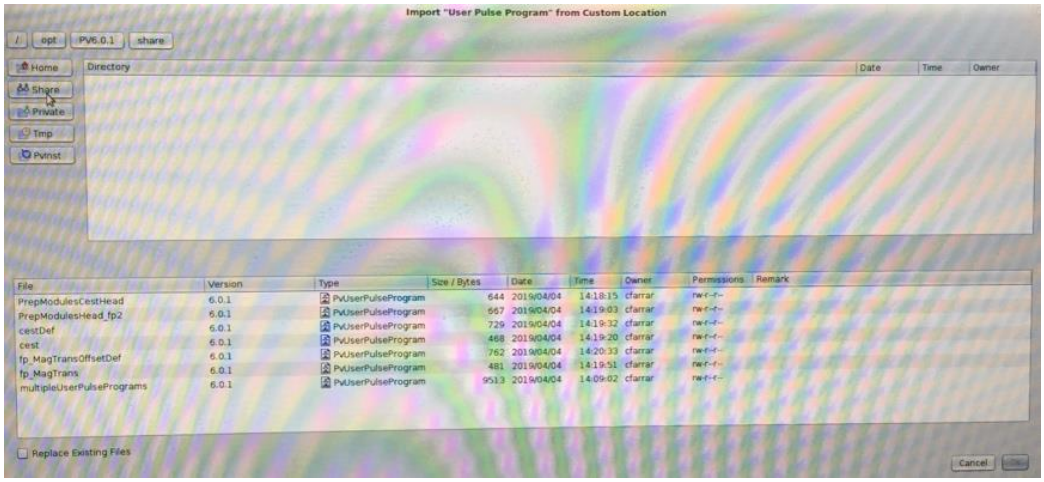


- Select the Share folder from the file navigation window and then select the appropriate pulse sequence and click OK

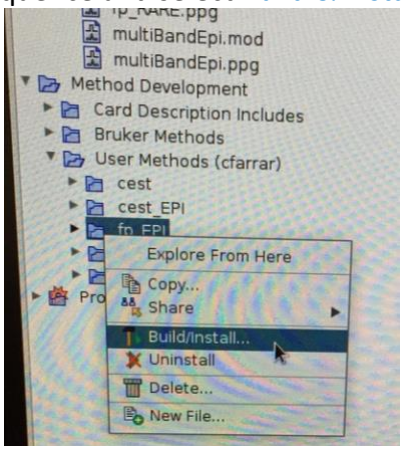
4. Import the modified MagTrans pulse sequence modules for CEST MRF
   - In Workspace Explorer tab, go to Pulse Programs folder, right click on the User folder, and select Import.



   - Select the Share folder from navigation window and then select the appropriate pulse sequence modules (fp_MagTrans, fp_MagTransOffsetDef, and PrepModulesHead_fp2) one at a time and click OK.

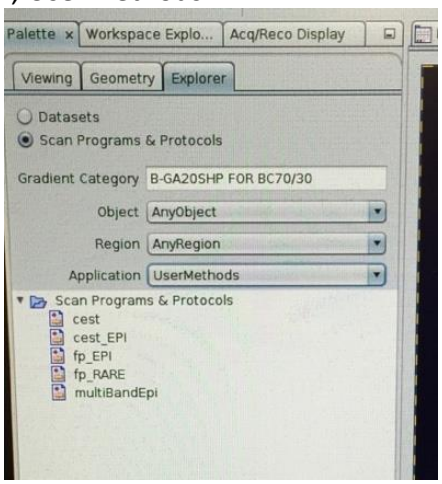


5. Compile the pulse sequence
   - In the Workspace Explorer tab, go to Method Development → User Methods folder
   - Right click on the pulse sequence and select Build & Install

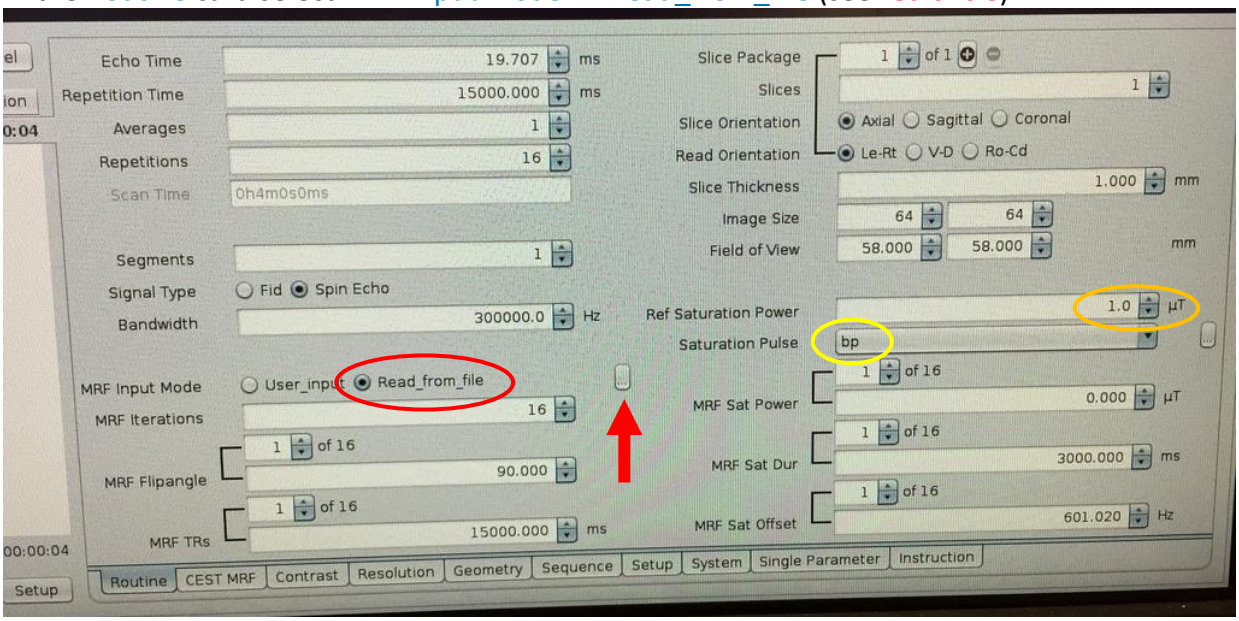


Setting Up the CEST MRF Sequence

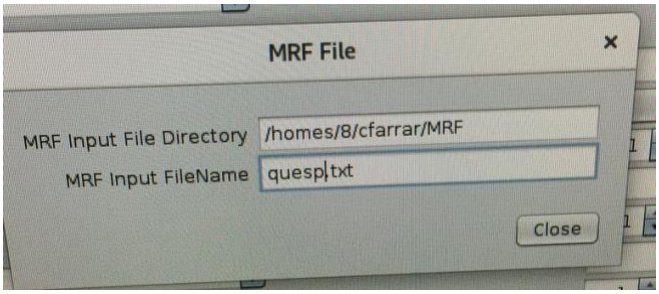
1. Running the EPI-based CEST MRF pulse sequence
    - In the Palette tab select the Explorer tab and the Scan Programs & Protocols button
    - Select AnyObject, AnyRegion, UserMethods



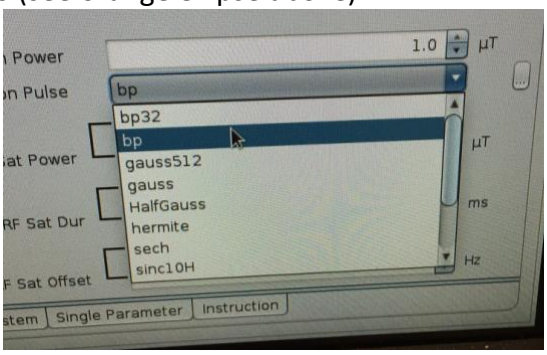
    - Drag the fp_EPI pulse sequence to the Instruction window
    - In the Routine card select MRF Input Mode → Read_from_file (see red circle)



    - Click on the button next to the MRF Input Mode (red arrow) and enter the path name and file name for the MRF acquisition schedule input text file (amide.txt or MT.txt). The default file directory and file name can be edited to your own directory in the initMeth pulse program file.



- The text files contain a list of the acquisition parameters. The first line contains the number of acquisitions. The other text lines contain the acquisition parameters for each acquisition with the parameters listed in order as TR, saturation power (μT), saturation frequency offset (ppm), excitation flip angle, and saturation pulse duration (ms).
- Set the "Saturation Pulse" shape to "bp" (see yellow ellipse above) and the "Ref Saturation Power" to 1.0 (see orange ellipse above)



2. Running the RARE-based CEST MRF pulse sequence
   - In the Palette tab select the Explorer tab and the Scan Programs & Protocols button
   - Select AnyObject, AnyRegion, UserMethods
   - Drag the fp_RARE pulse sequence to the Instruction window
   - In the Routine card select MRF Input Mode → Read_from_file, enter MRF input file directory and MRF Input FileName. The default file directory and file name can be edited to your own directory in the initMeth pulse program file.
   - Set the "Saturation Pulse" to "bp" and the "Ref Saturation power" to 1.0 μT.
   - In the Resolution tab set the Encoding Order to "Centric"