

## Standard-compliant enhanced multi-frame DWI

### Background

contributed by David Clunie; followup on April 30, 2015 QIICR bi-weekly meeting; data uploaded to <http://goo.gl/xb1ljG>

### Comments on the availability of enhanced multiframe DWI datasets

One publicly available example is at:

<ftp://medical.nema.org/MEDICAL/Dicom/DataSets/WG16/Philips/EnhancedMR/Brain/>

Look in Series 801; there is a DWI with B values of 0 and

I.e., each frame has an

```
(0x0018,0x9117) MRDiffusionSequence
```

with either:

```
(0x0018,0x9087) DiffusionBValue = 0  
(0x0018,0x9075) DiffusionDirectionality = NONE
```

or

```
(0x0018,0x9087) DiffusionBValue = 1000  
(0x0018,0x9075) DiffusionDirectionality = ISOTROPIC
```

Note also that the type of (inherent) contrast is specified too; in the:

```
(0x0018,0x9226) MRImageFrameTypeSequence
```

you will find:

```
(0x0008,0x9209) AcquisitionContrast = DIFFUSION
```

Another publicly available set of samples can be found at:

[ftp://ftp.ihe.net/Connectathon/samples/RAD-profiles/DIFF\\_samples/](ftp://ftp.ihe.net/Connectathon/samples/RAD-profiles/DIFF_samples/)

but these are less useful as a reference since: – the Philips images do not contain useful pixel data – the Hitachi images have a lot of issues with respect to the functional group encoding (try validating them), but do have pixel data

I also have some of Philips diffusion images that have directionality encoded; these are from an IHE test set, are of a phantom, so are not restricted in their use, but I don't think there is a public URL for them. Anyway, you can get them from:

<https://drive.google.com/open?id=0BzGsmNN8MvZqcG5oSIINMEw5VDA&authuser=0>

The image with the directionality contains for the non B0 frames, in

```
(0x0018,0x9117) MRDiffusionSequence
```

the attributes:

```
(0x0018,0x9087) DiffusionBValue = 800  
(0x0018,0x9075) DiffusionDirectionality = DIRECTIONAL  
(0x0018,0x9076) DiffusionGradientDirectionSequence
```

and in turn DiffusionGradientDirectionSequence contains:

```
(0x0018,0x9089) DiffusionGradientOrientation = -1\0\0
```

or

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`(0x0018,0x9089) DiffusionGradientOrientation = 0\ -1\ 0`

or

`(0x0018,0x9089) DiffusionGradientOrientation = 0\ 0\ 1`

PS. You can find the corresponding “single frame” (“legacy”) style images for the first case at:

<ftp://medical.nema.org/MEDICAL/Dicom/DataSets/WG16/Philips/ClassicSingleFrame/Brain/>