# 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/xb1IjG

## 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/

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 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=0BzGsmNN8MvZqcG5oSllNMEw5VDA&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

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

or

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

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

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