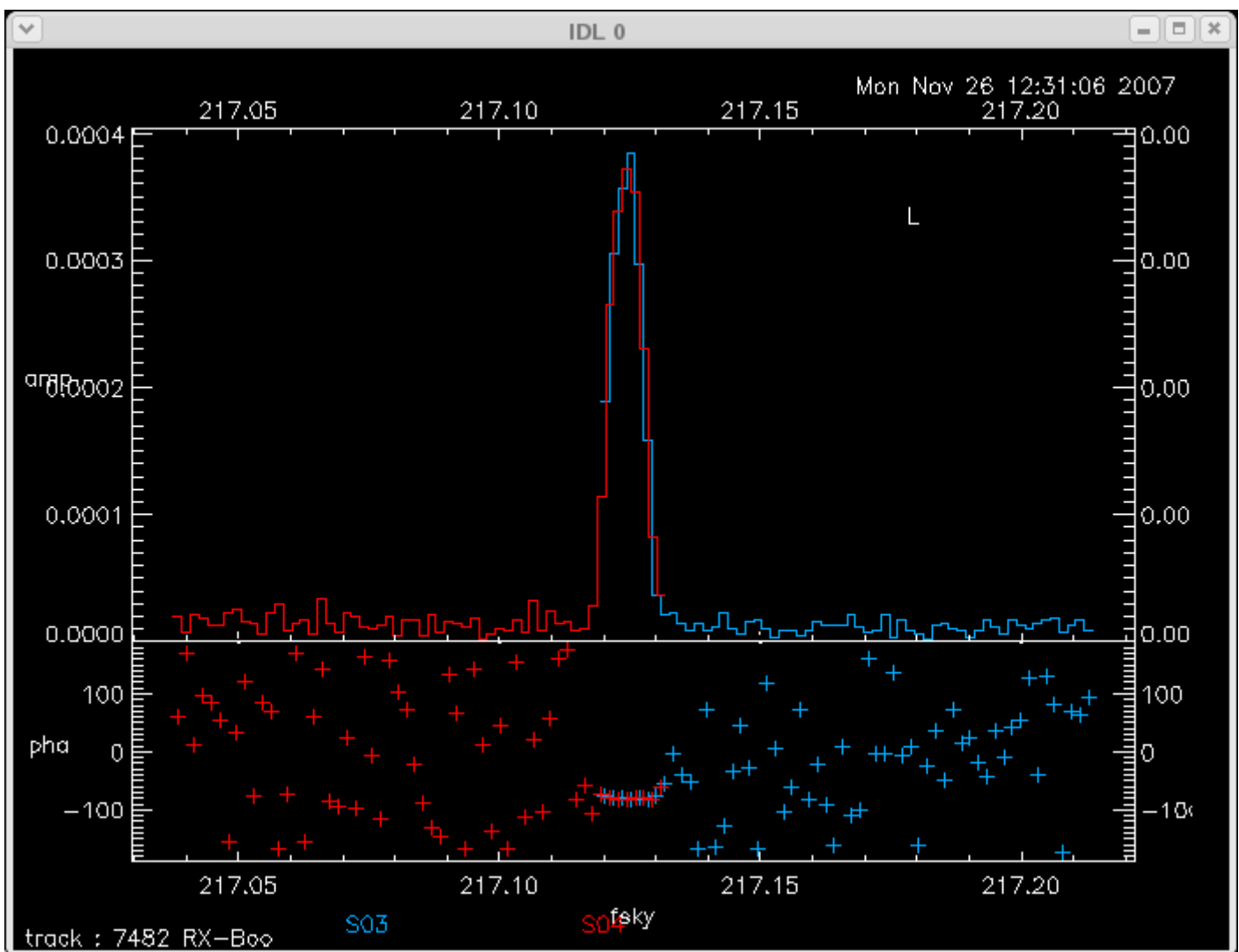


## Frequency labelling problem in Science Data

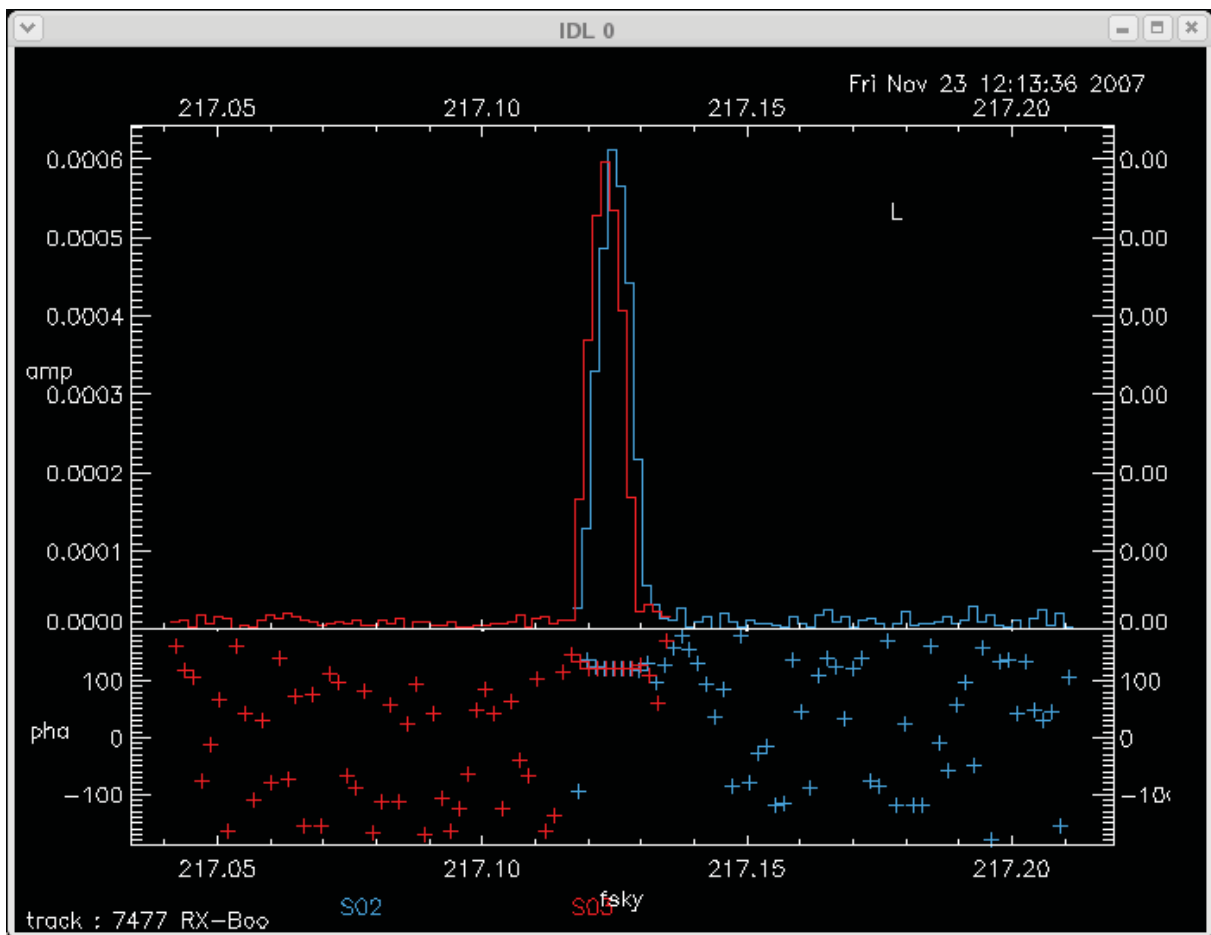
Mark, Taco

2007 Nov 26 22:59:20 UTC

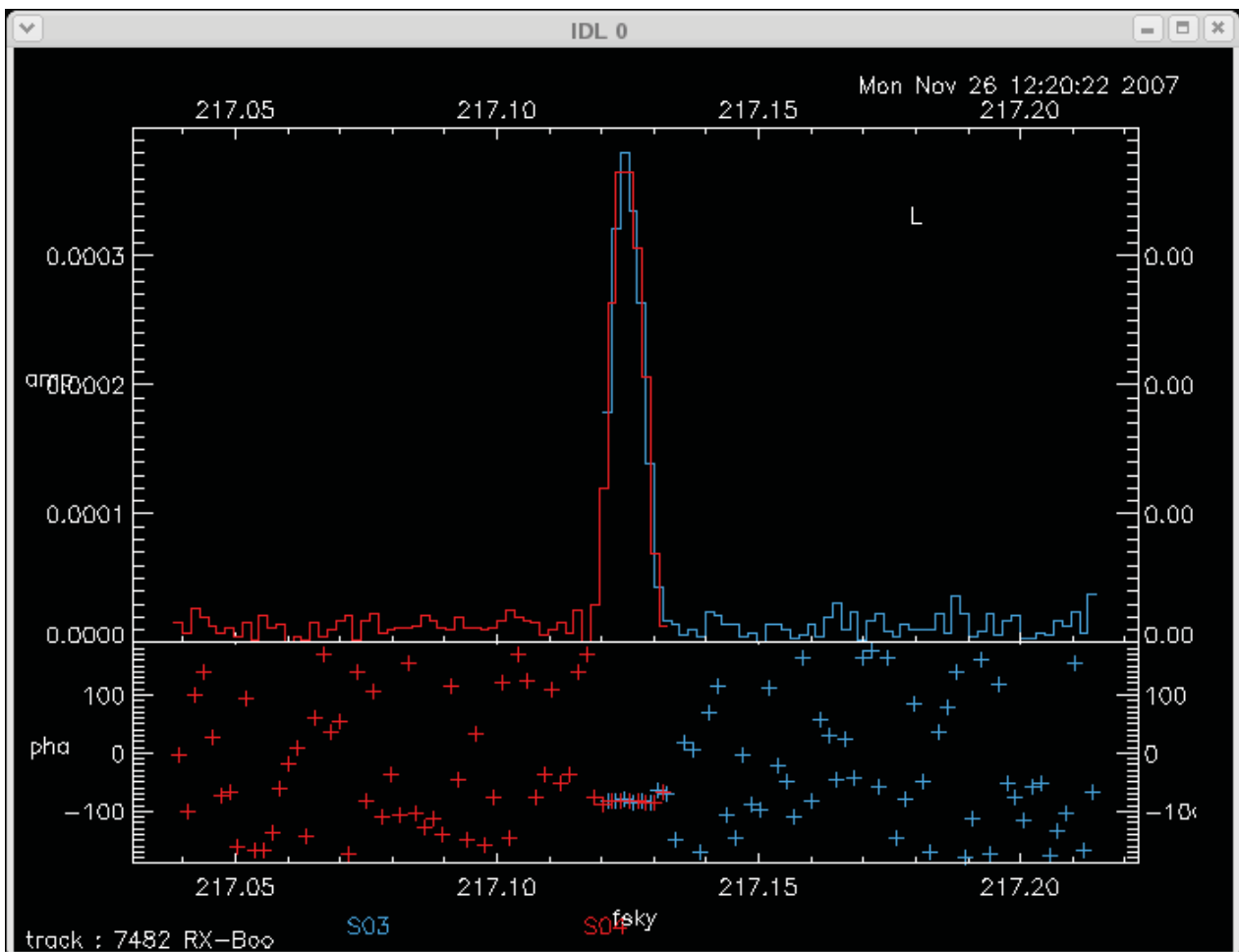
Some months ago, Mark noted that when we observed very strong spectral lines which spanned two chunks, the features seen in the chunk overlap region sometimes seemed to have somewhat different frequencies in the two chunks. Some chunk overlap regions showed the problem, others did not. The magnitude of the error was not constant on different tracks. This month, quite serendipitously, we happened to configure the correlator in a very unusual configuration for testing purposes, which provided all the information needed to make the problem appear to go away. It turns out that all of our data, since day one, has had 1/2 of the chunks labelled with frequencies and velocities 1/2 channel step too high, and the other half have been labelled with frequencies and velocities 1/2 channel step too low. The sign of the shift depends on the sideband used in the 2nd correlator mixing (the third mixing, if you count the mixing at the SIS junction). So chunks s01 and s02 were shifted one way, and s03 and s04 were shifted the other direction. This meant that no problem was apparent if a line straddled the s03/s04 overlap region, as shown below:



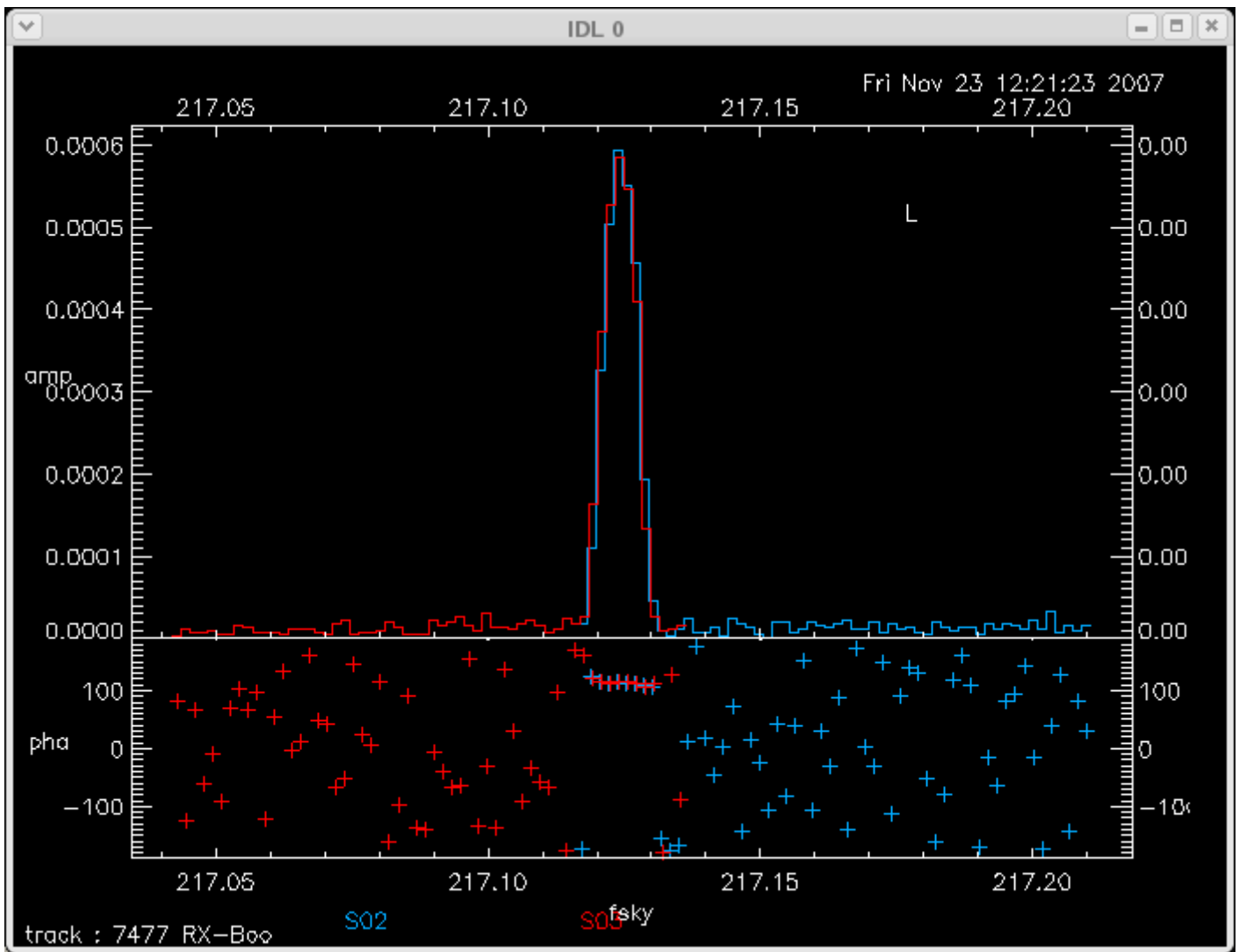
but there was a one channel mismatch (1/2 from each chunk) in the overlap regions such as s02/s03:



This problem has been fixed with , in an *ad hoc* way, with a new version of dataCatcher, as can be seen from this plot:



and this one:



Mark has worked out a sequence of MIR commands which will correct the labelling problem in old data sets:

```
select,/p,/re,band=['s01','s02','s05','s06','s09','s10','s13','s14','s17','s18','s21','s22']
sp[psf].fsky = sp[psf].fsky + 5.e-4*sp[psf].fres
sp[psf].vel = sp[psf].vel + 5.e-1*sp[psf].vres
```

```
select,/p,/re,band=['s03','s04','s07','s08','s11','s12','s15','s16','s19','s20','s23','s24']
sp[psf].fsky = sp[psf].fsky - 5.e-4*sp[psf].fres
sp[psf].vel = sp[psf].vel - 5.e-1*sp[psf].vres
```

The new version of dataCatcher has been copied into the default area, so data taken from now on should not need this correction.