From: **Christopher S. Moore** Christopher.Moore-1@colorado.edu
Subject: Re: OSPEX Modeling of MinXSS spectra
Date: Thursday, November 16, 2017 at 1:19 AM
To: Robert Sewell Robert.Sewell@lasp.colorado.edu, Bennet Schwab bennet.schwab@colorado.edu, Phil Chamberlin phil.chamberlin@lasp.colorado.edu, Tom Woods tom.woods@lasp.colorado.edu
Cc: Christopher Moore Christopher.Moore@lasp.colorado.edu

CM

Robert et al.,

You will want to become familiar with Solarsoftware (SSW). You probably do not already have this on your computer. After I leave LASP for the Harvard CfA on December 1, 2017 my suggestion is that Tom give you the Mac desktop that I have been using. James Mason and I have already installed, implemented SSW and I have numerous MinXSS code on it. You will need to become familiar with the information and code below before we meet to make the meeting more effective. At the very least, just look over the documents and the .pro files.

Attached is a Google Drive link to the zipped file containing all that you need to fit MinXSS-1 level 1 data in OSPEX, which utilized the Anyspec file option. I have commented allot of the codes. please read the comments and if they are not clear or you have questions let me know. If you have suggestions for improvement please let me know. This is the first time that I have written fairly involved software for autonomous fitting. You will have to change all the filepaths to your computer paths. This code will fit the data AUTONOMOUSLY, unless you set the keyword, spex_fit_manual = 1 in the function minxss_x123_compute_ospex_fit.pro.

The OSPEX_Files_Info.docx file should describe the basic process. Also, there are functions like gps2utc.pro and jd2gps.pro that you will need. If you do not already have these plus any others they, are in the "time" folder.

I will be written thorough documentation on the MinXSS Level1, Level4 and modified OSPEX fitting after my these defense.

Additional info from another email conversation:

All OSPEX spectral fits that I compute are from **counts/s spectra**, whether it is from the Level0D data or the Level1 data.

Let me clarify. I have re-written the entire Level1 code (back during the RHESSI-MinXSS conference). The current Level0D data is at the native 10 second time cadence of MinXSS, but it is all the science data (i.e. non-filtered for science). The new Level1 data is filtered, includes the photon flux, which is NOT just dividing by the diagonal of the DRM, I do include all off diagonal effects that are in our MinXSS Instrument paper except for Compton scattering (because the yield is so low). Included in Level1 is the actual count rate spectrum used to create the photon flux (science filtered).

There are different time averages of Level1 currently in the MinXSS-1 dropbox.

A. the nominal 10 second integrations - minxss1_l1_mission_length.sav
B. 1 minute averages (fixed time grid) - minxss1_l1_1_minute_mission_length.sav
C. 2 minute averages (fixed time grid) - minxss1_l1_2_minute_mission_length.sav
D. 5 minute averages (fixed time grid) - minxss1_l1_5_minute_mission_length.sav
E. 15 minute averages (fixed time grid) - minxss1_l1_15_minute_mission_length.sav
F. 60 minute averages (fixed time grid) - minxss1_l1_60_minute_mission_length.sav
G. 1440 minute averages (fixed time grid) - minxss1_l1_1440_minute_mission_length.sav

There are Level4 data at various time averages (computed directly from Level1 data). These are nominal OSPEX spectral fits using 1Tcoronal, 2Tcoronal, 1TFree, 2Tfree, 1TAllFree and 2TAllFree models.

The code that I sent Shyama and Athiray takes the current Level1 counts/s data at whatever time average that they choose to download from the MinXSS website or want to generate on their own from the nominal 10 second level 1 data, as long as they don't modify the structure tags (or else some of the code won't work, because of undefined entities).

I also have code that takes the Level0D data and puts it into a form that OSPEX can read and fit spectra (this is the MinXSS Instrument paper data). After I defend my dissertation I will write up a manual and info on the Level1 data, Level4 data and the autonomous OSPEX fitting codes that I sent out and implement on the MinXSS science processing MAC.

-Chris

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On Thu, Nov 16, 2017 at 1:11 AM, Christopher S. Moore <Christopher.Moore-1@colorado.edu> wrote:

> Hello Robert,
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> I cc'd Bennet, Tom and Phil, because I am going to forward you an email with all the OSPEX/SSW MinXSS procedures that I have at this stage in a following email and I want to make sure that they get a copy of it also. It is still a work in progress and if you see places for improvement, please let me know.
>
> I know I told Tom, Thursday afternoon to meet, but I need to finalize my Dissertation, to submit it electronically to the Graduate School on Thursday. Are you available this Friday? The week of November 27 is bad for me. I am moving to Cambridge, MA that week. The only day that I could meet would be that Monday (11/27/2017) and that is only if the Fiske Planetarium Show that I am filming for MinXSS gets done early.
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> -Chris
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> ::
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> On Wed, Nov 15, 2017 at 4:56 PM, Robert Sewell <Robert.Sewell@lasp.colorado.edu> wrote:
>
> > Hi Chris,
> >
> > When are you available to meet tomorrow? My only constraint is that I'm meeting with Dr. Woods at 9am tomorrow and then I have class at 3:30pm. If you're not available tomorrow I will be back in town the week of the 27th and could meet sometime then.
> >
> > Let me know what works best for you.
> >
> > -Robert
> > _____
> > From: Tom Woods
> > Sent: Wednesday, November 15, 2017 12:42 PM
> > To: Robert Sewell
> > Cc: Christopher Moore; Phil Chamberlin; Tom Woods
> > Subject: OSPEX Modeling of MinXSS spectra
> >
> > hi Robert,
> >
> > I assume we're meeting Thur morning as usual. In addition, could you find a time between now and before Nov 29 for you to meet with Chris Moore to learn how to use his OSPEX modeling procedures for MinXSS X123 spectra? Chris suggested this Thursday afternoon if that might be an option for you.
> >
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