Feedback on t-channel MadDM tutorial (Katharina)

General

1) Who is the main target audience for this tutorial? Some aspects might be a bit harder to follow for e.g. new PhD students with little MadGraph experience. E.g. you have a few comments where you compare something to standard MG5 behaviour: "all the outputs will be stored as separated outputs (different runs as in MG5)" on s5.

Specific

s3
I found this instruction a bit cryptic: "Go into your MG5 main directory and put into the PLUGIN directory the zip file provided as supplementary material into tool_files".
→ I guess what you mean is to copy all files from tool_files into PLUGIN or should the user copy the whole folder?
→ What happens to the useful_files folder? Should it be copied somewhere?
→ It would be nice to add a bullet explaining what the files in tool_files are for. Otherwise, the user just blindly follows instructions.

s4
"The UFO NLO model files"
→ I found this statement slightly confusing as you say above that the UFO for the tutorial is LO. Are you referring to this UFO (dmsimpt_v1.3.ufo.tgz)? If yes, maybe you could clarify on the slide why we use LO here and what the quark-mass settings are for the LO UFO.

s7
"relic density tag equivalent to @DM2SM"
→ Not sure what you mean by @DM2SM (except that it is a DM → SM annihilation process). Is it a standard MG tag?

s9
Maybe add a couple of comments explaining the output? It is relatively self-explanatory (calculated SI/SD cross-sections for the model point compared to excluded cross-sections from experiments) but given the limited amount of time people have to go through the slides, it might be nice to highlight the key features.

s11
When I run the gridscan, the MadDM output contains both cross-sections called "Thermal" and "All DM". Could you add a comment on the slides explaining the difference? I did not see this output for the single-point run.

What is the difference between scan_run_01.txt in useful_files and in test_gridscan/output? Is there a purpose of shipping this output file separately in useful_files?

s12
I tried running (on lxplus):
python S3M_ur_NLO.py scan_run_01.txt
and got this error:
Gtk-Message: 16:17:27.281: Failed to load module "canberra-gtk-module"
SI maj 9.68721005186e-55 3.91166254384e-55

Could you clarify that these are the two factors that need to be multiplied with the two columns, resepctively?

s13+s14
Is there a script to produce these plots?

s15:
"suppressed" → Do you mean "disfavoured" by current results?
Stupid question from an experimentalist: Why is it called "virtual internal bremsstrahlung" when the diagrams show the emission of a real photon?

s16
- Could you clarify: we want only option 4 installed? Is that correct?

Because when I run run_VIB later, I get these errors:

INFO: load configuration from
/afs/cern.ch/work/k/kbehr/MadDMTutorial/MG5_aMC_v2_7_2/test_VIB/Indirect/Cards/
me5_configuration.txt
INFO: load configuration from
/afs/cern.ch/work/k/kbehr/MadDMTutorial/MG5_aMC_v2_7_2/input/mg5_configuration.txt
INFO: load configuration from
/afs/cern.ch/work/k/kbehr/MadDMTutorial/MG5_aMC_v2_7_2/test_VIB/Indirect/Cards/
me5_configuration.txt
INFO: Computing sigmav with method: madevent
CRITICAL: Indirect detection: py8 code is not installed (or linked). Skip flux calculation
INFO: you can install pythia8 via the command: 'install pythia8'
INFO: Calculating Fermi limit using pythia8 gamma rays spectrum
quit
Command "import /afs/cern.ch/work/k/kbehr/MadDMTutorial/MG5_aMC_v2_7_2/run_VIB"
interrupted in sub-command:
"launch test_VIB" with error:
IOError : [Errno 2] No such file or directory:
'/afs/cern.ch/work/k/kbehr/MadDMTutorial/MG5_aMC_v2_7_2/test_VIB/Indirect/Events/run_01/
positrons_spectrum_pythia8.dat'
Please report this bug on https://bugs.launchpad.net/mg5amcnlo
More information is found in 'MG5_debug'.
Please attach this file to your report.

Should I install Pythia8? How can I re-run the indirect_detection installation after the first time?

s21
I was missing some sort of conclusion on what to do with the VIB and loop-induced diphoton calculations. Are they combined? How can they be compared to e.g. Planck results?