

WG2: Tools – Where we are

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1. WG1 – WG2 differences
2. WG2 Tools
3. Short analysis/discussion
4. Conclusions

1. WG1 – WG2 differences

“New” WG1 subgroup for tools:

Frank Krauss, Filip Moortgat, Giacomo Polesello

“New” WG2 subgroup for tools/new physics:

S.H., Fabrizio Parodi, Luca Silvestrini

⇒ **idea:** let's do the tools together

⇒ **substantial differences** showed up

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WG1: (quoting from our email exchange :-)

- more ATLAS/CMS oriented
- tools more relevant for (many) experimentalists
- examples: Pythia, Sherpa, Photos, . . .

WG2:

- more theory/theorists oriented tools?
- more low-energy codes to map out parameter space?
- more single/special purpose codes?

(notice the question marks!)

⇒ no agreement could be reached ⇒ discussion necessary!
When? Where?

⇒ concentrate on WG2 activities

2. WG2 Tools

Starting point to get an overview:

email to all WG1/WG2 participants, asking for

- What does your tool/code do?
In which model?
What is the input?
What is the output?
(In case of SUSY: is it SLHA(2) compatible?)
- Are there published results obtained with this tool/code?
Did you present it already during this workshop course?
If not, are you interested in a presentation?
- Is the tool/code public?
(Does even a manual exist?)
- What does the tool/code not do, i.e. what are its limitations?
- What are your future plans?

⇒ Only 10 answers . . .

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+ possibly codes/authors that did not feel covered by the questions

⇒ not too much :-)

As you will see: some variety:

- codes for low-energy observables
- codes for high-energy observables
- codes for the calculation of amplitudes
- codes to pass parameters/results from one code to another

Any additions/corrections are welcomed! :-)

And this is what there is:

(ordered roughly thematically)

Code # 1:

Name: no name (Silvestrini)

Description: $K\bar{K}$ mixing, $B_{(s)}\bar{B}_{(s)}$ mixing, $b \rightarrow s\gamma$, $b \rightarrow sl^+l^-$
in NMFV MSSM

Availability: planned

Code # 2:

Name: no name (Isidori)

Description: low-energy flavor observables in the (N?)MFV MSSM

Availability: planned/partially public

Code # 3:

Name: no name (Haisch)

Description: rare B and K decays in/beyond SM

Availability: planned

Code # 4:

Name: no name (Jäger)

Description: FCNC observables in MSSM

Availability: planned

Code # 5:

Name: no name (Bozzi)

Description: squark/gluino production at LO for NMFV MSSM

Availability: planned

Code # 6:

Name: FCHDECAY (Bejar, Guasch)

Description: FCNC Higgs decays in NMFV MSSM

Availability: yes

Code # 7:

Name: FeynHiggs (Hahn, Heinemeyer, Hollik, Weiglein)

Description: Higgs/EWPO phenomenology in the (N)MFV MSSM

Availability: yes

Code # 8:

Name: no name (Bejar)

Description: FC Higgs/top decays in 2HDM I/II

Availability: planned

Code # 9:

Name: FeynArts/FormCalc (Hahn)

Description: (arbitrary) one-loop corrections in (N)MFV MSSM

Availability: yes

Code # 10:

Name: SLHALib2 (Hahn)

Description: read/write SLHA2 data, i.e. NMFV/RPV/CPV MSSM, NMSSM

Availability: yes

Would be nice if the “planned availability” codes would really become available, including manual, web page etc.

⇒ will all go into our write-up

One more addition:

Name: UTfit (Silvestrini et al.)

Description: CKM fits, ... in SM, MSSM

Availability: ???

but will be part of our write-up!

SM: “in a few month”

MSSM: “possibly in a year”

Anybody here from CKMFitter? ;-)

3. Short analysis/discussion

All points are open for discussion [here](#):

- What is still missing?
Are all relevant WG2 fields covered?
- How can it be ensured that code/calculation is useful for others
Can experimentalists make use of them?
What are the wishes of the experimentalists?
- Status of complementarity with other fields?
Especially with WG1?
- Any synergy possible?

4. Conclusions

- Aparent **differences** between WG1 and WG2 (**discussion** necessary)
⇒ concentrate on WG2
- little survey with all WG1/WG2
~ 10 answers (only)
but with some variety
- codes for: low-energy observables
high-energy observables
the calculation of amplitudes
passing parameters/results from one code to another
- discussion needed: what is missing?
(how) can the codes be used?
useful (also) for experimentalists?
complementarity/synergy?