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
⇒ substantial differences showed up

**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 . . .
⇒ Only 10 answers . . . (leave out what is not (planned to be) public)

+ 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, $b \to s\gamma$, $b \to s l^+l^-$
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)
  \[\Rightarrow\text{concentrate on WG2}\]

- little survey with all WG1/WG2
  \[\sim 10\text{ answers (only)}\]
  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?