



Layout of program

DarkSUSY 4.2
(pre-release, trunk @ rev 231)

DarkSUSY day, Stockholm, June 16, 2008

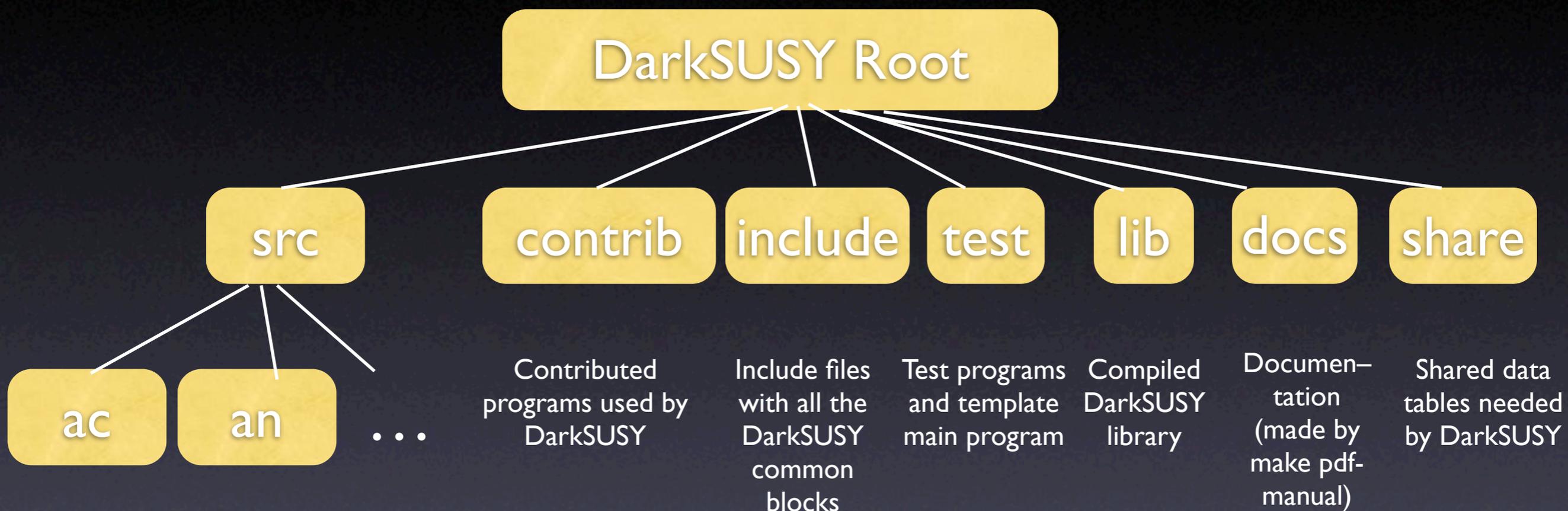


Philosophy

- Modular structure
- Library of subroutines and functions
- Fast and accurate
- “Standard” Fortran - works on many platforms
- Flexible
- Version control (subversion) for precise version tagging



Program layout



Here are the main routines of DarkSUSY making up libdarksusy.a

[Show layout]



Compile and install

- To compile and install DarkSUSY, do

```
./configure [optional arguments]  
make
```



Systemwide installations

- If you want to install DarkSUSY elsewhere (for the library and tables (usually in share)), instead do

```
./configure --prefix=<install-dir>
```

```
make
```

```
make install
```



Other options

- Other options can also be given at configure time, e.g. I use

```
./configure F77=ifort FFLAGS= FOPT=-O
```

to compile with ifort instead of default g77 (if available).



Manual

- A manual (not fully up-to date yet and doesn't cover everything) is distributed with DarkSUSY, create with
`make pdf-manual` (to make the default manual)
`make pdf-manual-short` to make a short version (without subroutine headers).
- Also see the headers of various subroutines for instructions.



Typical program

call dsinit

[make general settings]

[determine your model parameters your way]

call dsgive_model [or equivalent]

call dssusy [or equivalent]- to set up DarkSUSY for that model

[then calculate what you want]



*set routines

- Essentially all the packages in DarkSUSY have a corresponding *set routine that determines how those routines are going to be used, which parameter sets to use etc.
- As an example, call `dshmset('default')` chooses the default halo model (NFW)
- All these *set routines are called with the argument 'default' by `dsinit`, but can be changed later by the user.

[Show examples]



Routines in src/ I

- **ac:** accelerator constraints
- **an:** annihilation cross sections for neutralino and chargino coannihilations
- **an1l:** 1-loop annihilation cross sections ($\gamma\gamma$ and $Z\gamma$)
- **as:** annihilation cross sections for sfermion coannihilations
- **anstu:** auxiliary routines for neutralino and chargino coannihilations
- **bsg:** $b \rightarrow s \gamma$ routines



Routines in src/ II

- **db:** anti-deuterium
- **dd:** direct detection
- **docs:** general documentation, to be complemented by the more specific documentation in each subdirectory in src/
- **ep:** positron fluxes from the halo (Baltz & Edsjo implementation)
- **ep2:** positron fluxes from the halo (Ullio implementation)
- **ge:** general routines (integrators etc)



Routines in src/ III

- **ha:** halo annihilation routines
- **hm:** halo models
- **hr:** rates from halo annihilation
- **ib:** internal bremsstrahlung (photons and positrons)
- **ini:** initialization routines
- **nt:** rates from neutrino telescopes. Also includes Sun and Earth models for the capture rate calculations
- **pb:** antiproton fluxes from the halo



Routines in src/ IV

- **rd:** relic density routines (in general format, knows nothing about SUSY)
- **rn:** interface to relic density routines for SUSY neutralinos, these give the relic density of neutralinos
- **rge:** interface to RGE code isasugra for mSUGRA models
- **su:** general SUSY routines, mass spectra, vertices etc
- **suspect:** partly obsolete interface to suspect



Routines in src/V

- **wa:** WIMP annihilation routines to calculate yields of neutrinos, neutrino-induced leptons (e.g. muons) and hadronic showers from WIMP annihilation in the Earth/Sun. Note: these routines know nothing about SUSY, the interface to SUSY is done with dswasetup in the nt set of routines
- **xcern:** a few needed routines from CERNLIB
- **xcmlib:** a few needed routines from CMLIB
- **xfeynhiggs:** interface routines to FeynHiggs
- **xgalprop:** interface routines to galprop
- **xhdecay:** interface routines to HDecay