



SCTAVRG program description

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This binary of the SCTAVRG program will compute

- the average differential scattering cross section (DSCS)
- the scattering amplitude matrix
- the Mueller matrix
- the average scattering efficiency
- the average extinction efficiency
- the average scattering cross section
- the average extinction cross section

in a given scattering direction for a randomly oriented particle from a precomputed T-matrix.

The wavelength, the name of T matrix file, as well as Mrank and Nrank of the computed T-matrix have to be given in the InputSCTAVRG.dat file.

The parameters ntg, mtg have to be computed according to

$$\text{ntg} = \text{mtg} = \text{Nrank} + \text{Mrank} * (2 * \text{Nrank} - \text{Mrank} + 1)$$

and given correctly in the InputSCTAVRG.dat file.

With a T-matrix computed by the program SScaTT the parameters

axsym = .false.

chiral = .false.

should not be changed in the InputSCTAVRG.dat file.

Files needed:

SCTAVRG.exe

parameters.mod

InputSCTAVRG.dat

program SCTAVRG

!-----

! Compute the average differential scattering cross section (DSCS)
! and the scattering matrix in a given scattering direction for a randomly
! oriented particle
! Input parameters:
! - wavelength - real, wavelength of the ambient medium;

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! - FileTmat - string, name of the data file containing the T matrix;
! - Mrank, Nrank - integers, Mrank is the number of azimuthal modes (maximum
!           degree), while Nrank is the maximum expansion order
! - ntg, mtg - integers, physical dimensions of the (global) T matrix for a
!           nonaxisymmetric particle ;
! - ntl, mtl - integers, physical dimensions of the (local) T matrix for an
!           axisymmetric particle;
! - axsym - logical, axsym = t for axisymmetric scatterers, otherwise
!           axsym = f;
! - chiral - logical, chiral = t for chiral particles, otherwise chiral = f;
! - anorm - real, characteristic length of the scatterer;
! - Nalfa, Nbeta, Ngama - integers, number of integration points for the
!           numerical integration of the scattering matrix over
!           the Euler angles;
! - Nteta - integer, number of scattering angles at which the average DSCS
!           is computed.
!-----

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InputSCTAVRG.dat

```

&OptProp wavelength = 0.500
/
&Tmat   FileTmat = 'cube-0-245-10-5-05.tma'
        Nrank    = 10
        Mrank    = 5
        ntl      = 17
        mtl      = 17
            ntg    = 90
            mtg    = 90
            axsym  = .false.
            chiral = .false.
/
&GeomProp anorm    = 1.0
/
&NumAavg Nalfa     = 30
        Nbeta      = 60
        Ngama      = 15
/
&SctWave Nteta     = 181
/

```

Sample computational result

```

superellipsoid
e=n=0.2,
5472 faces
a=b=c=0.24537 μm,
lam = 0.5 μm
n=1.5 + i 0.0

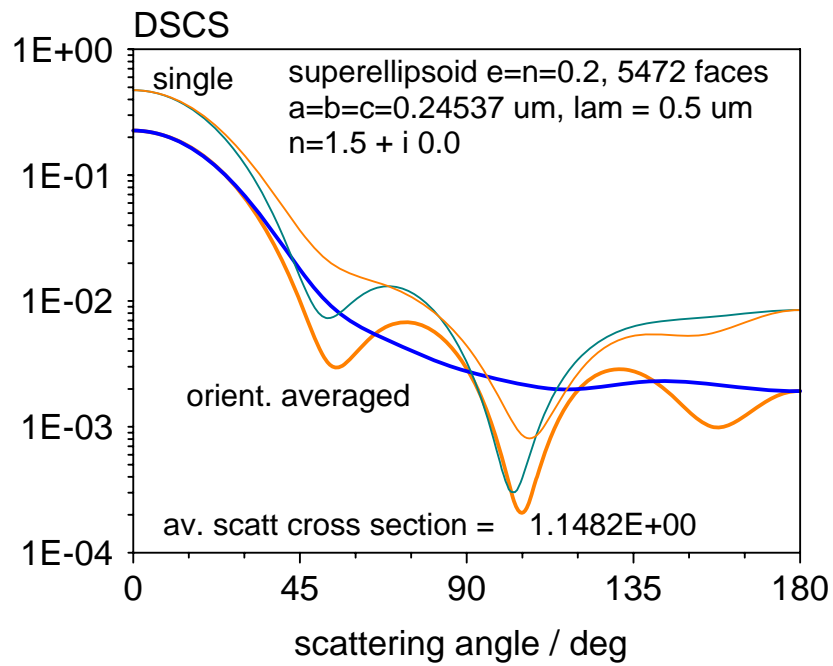
```

Single scattering result

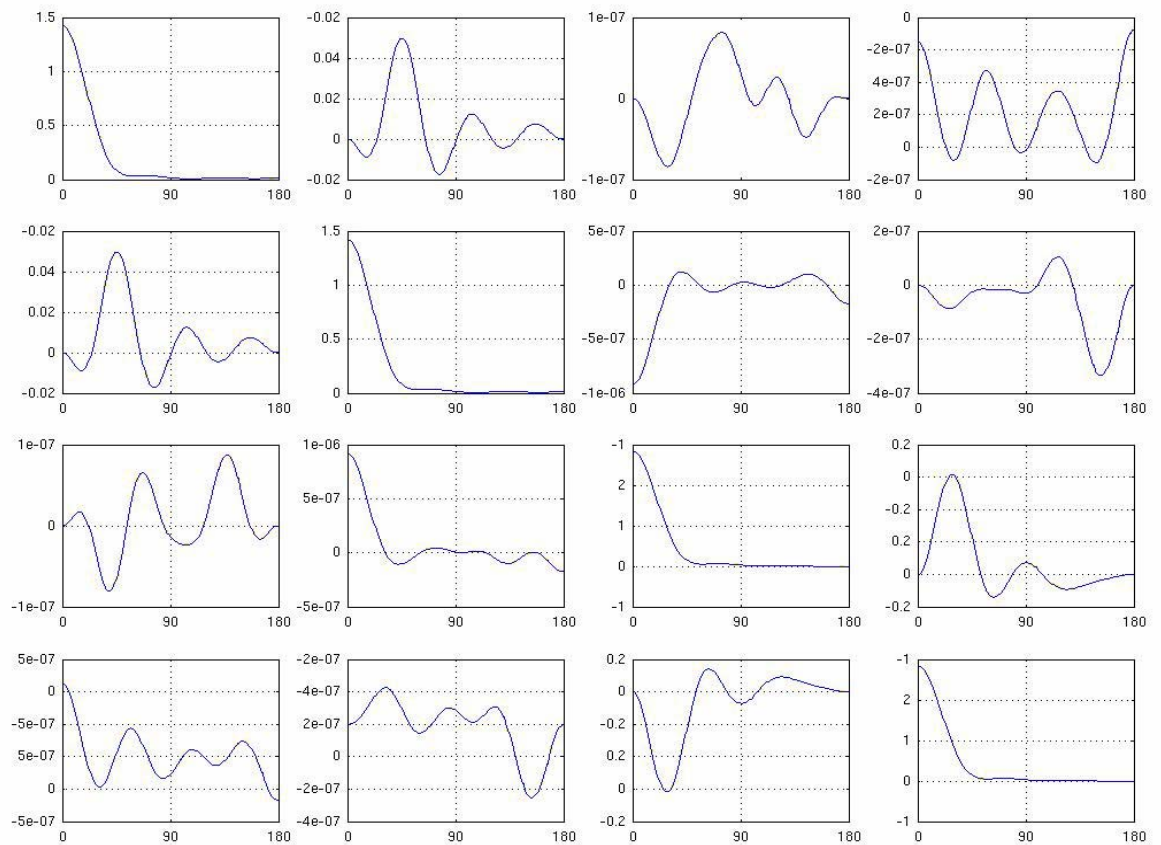
DSC-cube-0-245-10-5-05.out

Orientation averaged result, incident polarization 45 deg
or-av-DSC-cube-0-245-10-5-05.txt

Orientation averaged Mueller Matrix
aScatM-cube-0-245-10-5-05.txt



Orientation averaged Muller matrix



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