



# Computational light scattering (PAP315)

## Lecture 6b

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# What you need for installing and running SIRIS



- Linux/Mac/Windows+MSYS2 with GCC gfortran compiler
- GNU make tool



- Go to <https://bitbucket.org/planetarysystemresearch/siris4-framework>
- Get package by downloading the zip from *Downloads*
  - `wget https://bitbucket.org/planetarysystemresearch/siris4-framework/get/94b3eb39c45d.zip`
  - `unzip 94b3eb39c45d.zip`
  - `mv planetarysystemresearch-siris4-framework-94b3eb39c45d siris4-framework`
- ...or by git:
  - `git clone https://bitbucket.org/planetarysystemresearch/siris4-framework.git`
- `cd siris4-framework`
- `make GS`
- `make singleparticle`
- `make singletwolayer`



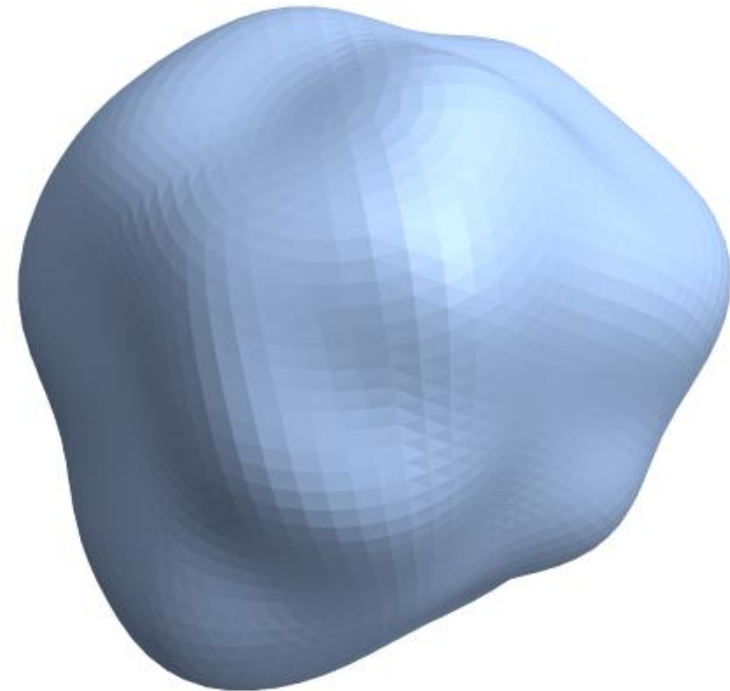
- All SIRIS/GS parameters are given in input file. When running, give the name of the input file in the command line as 1<sup>st</sup> parameter:

- **GS input-file.in**

Input file template:

```
--  
INPUT FILE for Gaussian spheres (sirisi4-framework)  
--  
1      ! Number of Gaussian spheres.  
0      ! Seed for the random number generator. Non-  
       ! positive number for random seed.  
0.1    ! Relative standard deviation of radial  
       ! distance.  
3.0    ! Power law index for correlation. Increase for  
       ! more regular shape.  
2      ! Minimum degree in correlation series. Increase  
       ! for rough shape.  
10     ! Maximum degree in correlation series.  
       ! Increase for rough shape.  
30     ! Discretization: number of triangle rows per  
       ! octant.  
! Next line, prefix for output files.  
gs-out
```

```
0      ! Output in Matlab format. 0 for no, 1 for  
       ! yes.  
0      ! Output for IDL format.  
0      ! Output in VTK format  
1      ! Output in OFF format
```





- All SIRIS parameters are given in input file. When running SIRIS, give the name of the input file in the command line as 1<sup>st</sup> parameter:

- `siris1p input-file.in`

Input file template:

```
50000      ! number of rays
1          ! number of sample particles
1.0d-4     ! Minimum relative flux
21         ! Max internal chord
21         ! Max external chord
60         ! number of scattering angle bins
1.0        ! Refractive index of the medium
1.5        ! particle refractive index, real
0.1E-020   ! particle ref index, imag
0          ! seed for random number generation
1.5E+000   ! wavelength in micrometers
200.0      ! Mean radius (in micrometers)
1          ! run identification number
1          ! Internal medium: 1=yes
1          ! Scattering matrix: input(1), Rayleigh(2)
0.549069   ! Internal medium: single-scattering albedo
53.33      ! Internal medium: mean free path (in
           ! micrometers)
0.5        ! Diffuse-medium asymmetry parameter
           ! (internal)
```

```
0.5        ! Diffuse-medium forward asymmetry (internal)
-0.0       ! Diffuse-medium backward parameter
           ! (internal)
0.3        ! Diffuse-medium single-scattering max.
           ! polarization
60         ! Number of phase matrix angular points
1000       ! Number of points in random number array
32         ! Number of G-L integration points for cosine
           ! map
0.2        ! Relative standard deviation of radius
4.0        ! Power law index for C_1 correlation
10         ! Maximum degree in C_1, C_2, C_3
30         ! Number of rows in an octant
test1      ! prefix for output file
0          ! external input mesh type: 0=no mesh, 1=OFF,
           ! 2=OBJ
0          ! Translate vertex mean to origin: 0=no,
           ! 1=yes
0          ! Scale vertex mean radius to one: 0=no,
           ! 1=yes
GS-geom.off ! external mesh file name
```

# SIRIS two layer, running



- All SIRIS parameters are given in input file. When running SIRIS, give the name of the input file in the command line as 1<sup>st</sup> parameter:

- `siris2|input-file.in`

Input file template:

```
1000      ! number of rays
10        ! number of sample particles
1.0d-4    ! Minimum relative flux
50        ! Max internal chord
50        ! Max external chord
90        ! number of scattering angle bins
1.0       ! Refractive index of the medium
1.88      ! Mantle: Particle refractive index (real)
0.037     ! Mantle: Particle refractive index (imag)
1.88      ! Core: Particle refractive index (real)
0.037     ! Core: Particle refractive index (imag)
0         ! seed for random number generation
0.200     ! Wavelength
20.200d0  ! Outer radius (in micrometers)
20.0d0    ! Inner radius (in micrometers)
1         ! Identification number for run
1         ! External medium: 1=yes
0         ! Internal medium: 1=yes
0.097     ! External medium: single-scattering albedo
```

```
1.0d0     ! Internal medium: single-scattering albedo
1.19      ! External medium: mean free path (in
micrometers)
1.0d0     ! Internal medium: mean free path
180       ! Number of phase matrix angular points
1000      ! Number of points in random
number array
256       ! Number of G-L integration points for
cosine map
0.1       ! Relative standard deviation of radius
2.0       ! Power law index for C_3 correlation
10        ! Maximum degree in C_1, C_2, C_3
24        ! Number of rows in an octant
test3-    ! Prefix for the output file names
```

