```
/*------------------------------------------------------------------------------------------------------- */
/*                                                                                                         */
/*                                                                                                         */
/*                     3D VARIABLE PARTICLE CORE CENTRAL DENSITY                          */
/*                                                                                                         */
/*                                                                                                         */
/*------------------------------------------------------------------------------------------------------- */
/* (c) Copyright Terence Witt 2007, All Rights Reserved */
/* NULLPHYSICS.COM */
/* HYPERDENSITY CALCULATIONS */

/* master includes */
#include "witt.h"
#include "resource.h"
#include "zproject.h"

BOOL CoreRecession(char *parfile, char *resultfile, BOOL x_symmetric, BOOL force_once, double force_d,
          double force_rc, double force_rscan, double force_corrlimit, double force_centralsamplesize,
          char *tottim);


/*------------------------------------------------------------------------------------------------------- */
/*                                                                                                         */
/*                     MULTINUCLEON CORE CENTRAL ENERGY DENSITY                      */
/*                                                                                                         */
/*------------------------------------------------------------------------------------------------------- */
/* calculate the average energy density in the central region of a hexagonally packed core lattice */
void CoreEnergyDensity(void)
{
          char     parfile[200];
          double   rcenter=0.0, rscan=0.0;
          long     maxcore=0, n;

          if(GetText(hWndMain, "Centroid Size"))
          {
                    rcenter = atof(note_text);
                    rscan = (2*rcenter) + 0.1;
          }

          if(GetText(hWndMain, "Maximum Core Number"))
          {
                    maxcore = atol(note_text);
          }

          for(n=12; n<=maxcore; n++)
          {
                    sprintf(parfile, "%snu%ld.dat", NUCPATH, n);
                    if(FileExist(parfile))
                    {
                              CoreRecession(parfile, "", FALSE, TRUE, 0.0, 0.0, rscan, 0.0, rcenter, "");
                    }
                    if(KeyDown(VK_ESCAPE))
                    {
                              break;
                    }
          }
}
```

```
/*------------------------------------------------------------------------------------------------------------ */
/*                                                                                                             */
/*          MULTINUCLEON CORE CENTRAL ENERGY DENSITY AVERAGE                                     */
/*                                                                                                             */
/*------------------------------------------------------------------------------------------------------------ */
/* average the energy densities of all of the core clusters */
void CoreDensityAverage(void)
{
        char      grafile[200], af[300];
        double    dense, avedense=0.0, totdense=0.0, volume;
        long      n;

        strcpy(grafile, CORE_DENS);

        for(n=41; n<=64; n++)
        {
                FileGetLine(grafile, n, af, sizeof(af));
                dense = atof(&af[80]);
                if(dense>0.0)
                {
                        avedense += dense;
                        totdense++;
                }
        }
        Gframe(MESSAGEFRAME);
        volume = 64.0*(4.0*PI/3.0)*Rp*Rp*Rp;
        sprintf(af, "Average Density: %6.4e", (avedense/totdense)*(mp)/volume);
        Gbold(1);
        Gjust(TA_CENTER);
        Gtextframesmall(MESSAGEFRAME, COLORBLUE, "", af, 21);
}
```