```
moduleuser_defined_types
    use,intrinsic::iso_c_binding
    usefdps_vector
    usefdps_super_particle
    implicitnone

    type,public,bind(c)::full_particle!$fdpsFP,EPI,EPJ,Force
        !$fdpscopyFromForcefull_particle(pot,pot)(acc,acc)
        !$fdpscopyFromFPfull_particle(id,id)(mass,mass)(eps,eps)(pos,pos)
        !$fdpsclearid=keep,mass=keep,eps=keep,pos=keep,vel=keep
        integer(kind=c_long_long)::id
        real(kind=c_double)mass!$fdpscharge
        real(kind=c_double)::eps
        type(fdps_f64vec)::pos!$fdpsposition
        type(fdps_f64vec)::vel!$fdpsvelocity
        real(kind=c_double)::pot
        type(fdps_f64vec)::acc
    endtypefull_particle

    contains

    subroutinecalc_gravity_pp(ep_i,n_ip,ep_j,n_jp,f)bind(c)
        integer(c_int),intent(in),value::n_ip,n_jp
        type(full_particle),dimension(n_ip),intent(in)::ep_i
        type(full_particle),dimension(n_jp),intent(in)::ep_j
        type(full_particle),dimension(n_ip),intent(inout)::f
        integer(c_int)::i,j
        real(c_double)::eps2,poti,r3_inv,r_inv
        type(fdps_f64vec)::xi,ai,rij

        doi=1,n_ip
            eps2=ep_i(i)%eps*ep_i(i)%eps
            xi=ep_i(i)%pos
            ai=0.0d0
            poti=0.0d0
            doj=1,n_jp
                rij%x=xi%x-ep_j(j)%pos%x
                rij%y=xi%y-ep_j(j)%pos%y
                rij%z=xi%z-ep_j(j)%pos%z
                r3_inv=rij%x*rij%x&
                        + r i j % y * r i j % y &
                        + r i j % z * r i j % z &
                        + e p s 2
                r_inv=1.0d0/sqrt(r3_inv)
                r3_inv=r_inv*r_inv
                r_inv=r_inv*ep_j(j)%mass
                r3_inv=r3_inv*r_inv
                ai%x=ai%x-r3_inv*rij%x
                ai%y=ai%y-r3_inv*rij%y
                ai%z=ai%z-r3_inv*rij%z
                poti=poti-r_inv
            enddo
            f(i)%pot=f(i)%pot+poti
            f(i)%acc=f(i)%acc+ai
        enddo

    endsubroutinecalc_gravity_pp

    subroutinecalc_gravity_psp(ep_i,n_ip,ep_j,n_jp,f)bind(c)
        integer(c_int),intent(in),value::n_ip,n_jp
        type(full_particle),dimension(n_ip),intent(in)::ep_i
        type(fdps_spj_monopole),dimension(n_jp),intent(in)::ep_j
        type(full_particle),dimension(n_ip),intent(inout)::f
        integer(c_int)::i,j
        real(c_double)::eps2,poti,r3_inv,r_inv
        type(fdps_f64vec)::xi,ai,rij

        doi=1,n_ip
            eps2=ep_i(i)%eps*ep_i(i)%eps
            xi=ep_i(i)%pos
            ai=0.0d0
            poti=0.0d0
            doj=1,n_jp
                rij%x=xi%x-ep_j(j)%pos%x
                rij%y=xi%y-ep_j(j)%pos%y
                rij%z=xi%z-ep_j(j)%pos%z
                r3_inv=rij%x*rij%x&
                        + r i j % y * r i j % y &
                        + r i j % z * r i j % z &
                        + e p s 2
                r_inv=1.0d0/sqrt(r3_inv)
                r3_inv=r_inv*r_inv
                r_inv=r_inv*ep_j(j)%mass
                r3_inv=r3_inv*r_inv
                ai%x=ai%x-r3_inv*rij%x
                ai%y=ai%y-r3_inv*rij%y
                ai%z=ai%z-r3_inv*rij%z
                poti=poti-r_inv
            enddo
            f(i)%pot=f(i)%pot+poti
            f(i)%acc=f(i)%acc+ai
        enddo

    endsubroutinecalc_gravity_psp

endmoduleuser_defined_types
```