

```
1 using System;
2 using System.Windows.Forms;
3
4 namespace InteractionEnergies
5 {
6     public partial class Form1 : Form
7     {
8         public Form1()
9         {
10             InitializeComponent();
11         }
12
13         private void button1_Click(object sender, EventArgs e)
14         {
15             try
16             {
17                 int n1 = (int)numericUpDown1.Value;
18                 int l1 = (int)numericUpDown2.Value;
19                 int n2 = (int)numericUpDown3.Value;
20                 int l2 = (int)numericUpDown4.Value;
21                 int Z = (int)numericUpDown5.Value;
22                 double epsabs = 1.0e-7, epsrel = 1.0e-6, eps = 0;
23                 int ierr = 0, number = 0;
24
25                 InteractionIntegral inter = new InteractionIntegral(
26                     n1, l1, n2, l2, Z);
27                 Integration integ = new Integration();
28                 RadialWaveFunction rwf = new RadialWaveFunction();
29                 double mu = rwf.Mu(rwf.me_schiff, Z * rwf.mp_schiff);
30                 double amu = rwf.a_mu_schiff_unscaled(mu);
31                 double E1 = rwf.En_schiff_scaled(amu, Z, n1);
32                 double E2 = rwf.En_schiff_scaled(amu, Z, n2);
33                 double IA = 5.0 * rwf.e_schiff * rwf.e_schiff * Z /
34                     (8.0 * amu) * 6.24150907446076e11;
35                 double IC = rwf.e_schiff * rwf.e_schiff *
36                     integ.Half(inter.lo, inter.hi, 6,
37                     inter.IntegrationFunction, epsabs, epsrel, 50000,
38                     ref eps, ref number, ref ierr) *
39                     Z * Math.Pow(2.0 / amu, 5) * 6.24150907446076e11 *
40                     Math.Pow(2.0 * Math.PI, 8) * Math.Sqrt(2);
41                 double Ee = -2.903 * rwf.e_schiff * rwf.e_schiff /
42                     amu * 6.24150907446076e11;
43                 double Ep = E1 + E2 + IA;
44
45                 textBox1.Text = Ep.ToString("F6") + " eV";
46                 textBox2.Text = Ee.ToString("F6") + " eV";
47                 textBox3.Text = IA.ToString("F6") + " eV";
48                 textBox4.Text = IC.ToString("F6") + " eV";
49             }
50
51             catch (Exception ex)
52             {
```

```
53         MessageBox.Show(ex.Message, "Warning",
54             MessageBoxButtons.OK, MessageBoxIcon.Warning);
55     }
56 }
57 }
58 }
```