The User Interface

We present here the elements that can be altered by the user of the simulation before it starts or during it, to adapt it to his/her preferences. We, also explain the content of some of the simulation output data. In Fig. 1 and 2 we present the left and right part of the control area, respectively. In the following tables we explain the function of every element beside the corresponding number that we have assigned to each element in Figs. 1 and 2.

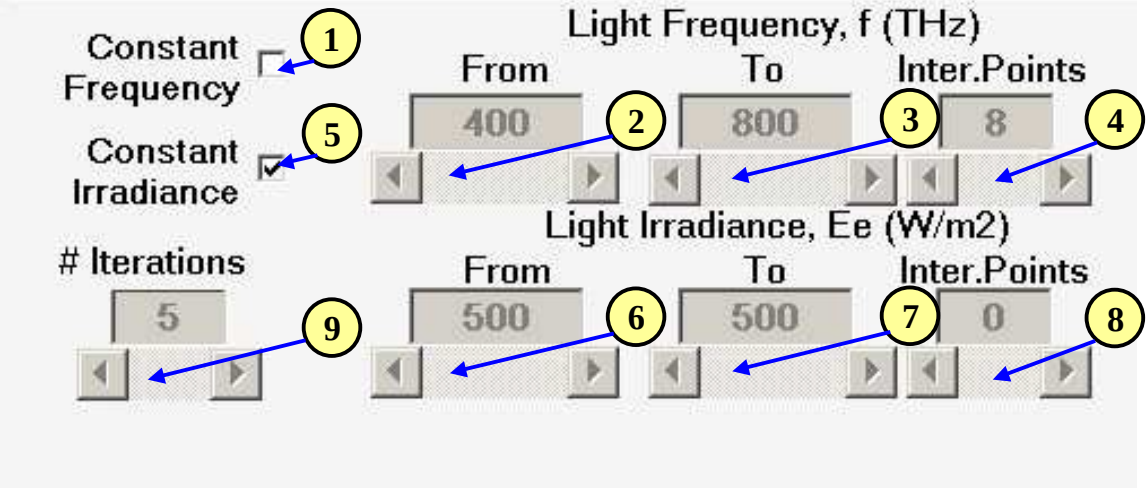

Figure 1. *The left part of the simulation control panel.*

#	Explanation
1	When this check box is selected, the frequency f of the light remains constant. In order to select different values to items 2 and 3, this item should not be selected. This check box should not be selected simultaneously with the control panel 5 of constant irradiance E_e, if we wish E_e to vary.
2	With this slider the lesser value of light frequency f in the range of values 100-1000 THz is selected. The text box above it shows the selected value of f in THz.
3	With this slider the greater value of light frequency f in the range of values 100-1000 THz is selected. The text box above it shows the selected value of f in THz.

4	With this slider, the number of intermediate frequency points between the frequency values selected by the scroll bars 2 and 3 is selected. The text box above it displays the number of the selected intermediate points.
5	When this check box is selected, the irradiance E_e of the light remains constant. In order to select different values to items 6 and 7, this item should not be selected. This check box should not be selected simultaneously with the control panel 1 of constant frequency *f*, if we wish *f* to vary.
6	With this slider the lesser value of light irradiance E_e in the range of values 100-1000 W/m^2 is selected. The text box above it shows the selected value of E_e in W/m^2.
7	With this slider the greater value of light irradiance E_e in the range of values 100-1000 W/m^2 is selected. The text box above it shows the selected value of E_e in W/m^2.
8	With this slider, the number of intermediate irradiance points between the irradiance values selected by the scroll bars 6 and 7 is selected. The text box above it displays the number of the selected intermediate points.
9	With this slider the number n_c of iterations of the simulation with the same frequency and intensity values is selected. **Increasing n_c reduces the statistical fluctuations and increases the accuracy of the calculations**, since the results of previous iterations are stored and the final result for each *f* and E_e is calculated as the average with the corresponding error.

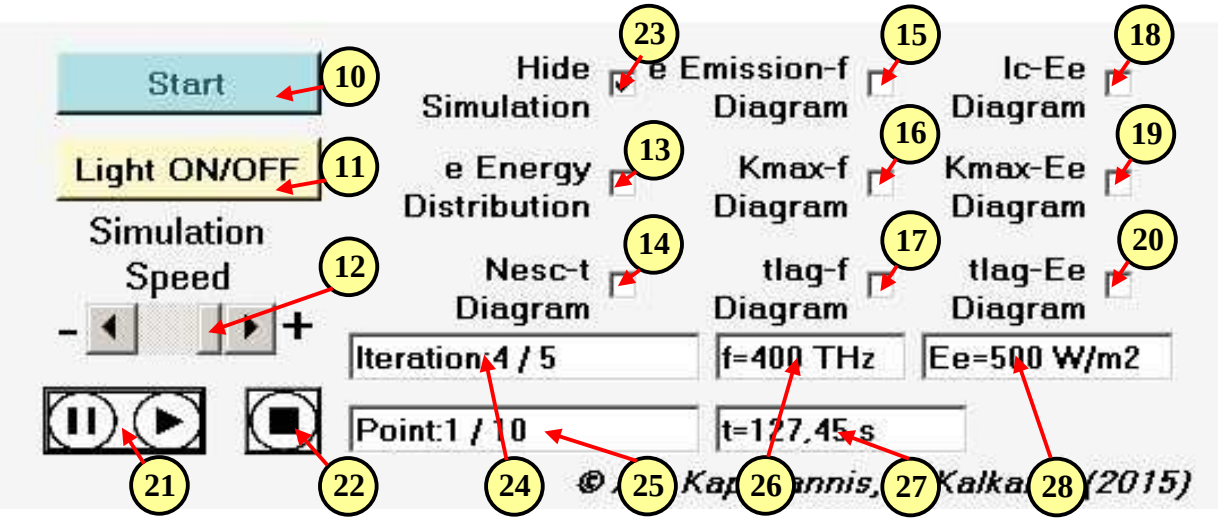

Figure 2. *The right part of the simulation control panel.*

#	Explanation
10	By pressing the button “Start” the simulation **begins** with the presentation of a section of a metal conductor with ions performing thermal motions around their equilibrium positions and electrons moving and performing collisions between them and with the ions. The incidence of light does NOT begin yet.
11	The “Light ON/OFF” is enabled once the “Start” button is pressed. By pressing it **the incidence of light to the metal starts** (with the **form of a wave**). The interaction of light with the electrons begins once the light strucks the metal, i.e. when the wave reaches the medium of the metal area. From that moment on time begins to count. Repressing the button causes the light to stop. With this button **the user can stop and restart the incidence of light at will**.
12	This slider **controls the speed of execution of the simulation**. It is preset by the program at full speed. Moving to the left decreases the speed of the simulation. In this way the user can observe microscopic processes in greater detail.
13	By selecting this check box the user can observe the **energy distribution of electrons** inside the metal (number of e- per unit of energy). The energy boundaries corresponding to Extraction Work, *W*, are displayed.

14	The selection of this check box displays **the graph of the number of escaped electrons versus time** (N_{esc}–t). This chart can be used for the calculation of **delay time** and **the intensity of the photocurrent** (by the slope of the graph).
15	The selection of this check box displays the **electron emission diagram as function of frequency** (e-Extraction–f). This diagram can be displayed simultaneously with the I_c–E_e diagram.
16	The selection of this check box displays the **diagram of maximum electron kinetic energy as function of frequency** (K_{max}–f). This chart cannot be simultaneously displayed with the K_{max}–E_e diagram.
17	The selection of this check box displays the **diagram of time lag as function of frequency** (t_{lag}–f). This chart cannot be simultaneously displayed with the t_{lag}–E_e diagram.
18	The selection of this check box displays the **diagram of photocurrent intensity as function of light irradiance** (I_c–E_e). This chart cannot be simultaneously displayed with the e-Extraction–f diagram.
19	The selection of this check box displays the **diagram of maximum electron kinetic energy as function of light irradiance** (K_{max}– E_e). This chart cannot be simultaneously displayed with the K_{max}–f diagram.
20	The selection of this check box displays the **diagram of time lag as function of light irradiance** (t_{lag}–E_e). This chart cannot be simultaneously displayed with the t_{lag}–f diagram.
21	Pressing this button will **pause temporarily** the simulation. The repressing will **restart** from the pause point. The user can **stop and restart the execution of the simulation** in order to make various observations.
22	Pressing this button **completely stops the execution** of the simulation. Restart is not possible.

23	Selection of this check box **causes the simulation to run without displaying the microscopic processes** (**which are, though, taking place**). The diagrams, however, are updated upon completion of each cycle. This obscure is important because **it greatly limits the time** required to extract the results. It is therefore **very important in the performing of multiple iterations to increase accuracy**.
24	This text box displays the **current number of iteration** of the simulation and the total number n_c of repetitions to be performed with the same values of frequency and irradiance of light.
25	This text box displays the **number of the current point** of the simulation and the total number of points to be run. Each point differs from the next, in the light frequency or the light irradiance value. The calculations for each point will be repeated n_c times.
26	This text box displays the value of **light frequency** f in THz for the point that is currently running.
27	This text box displays the value of **light irradiance** E_e in W/m^2 for the point that is currently running.
28	This text box displays the current value of **time** t in the current iteration. Time measurement starts just as light falls on the metal.