

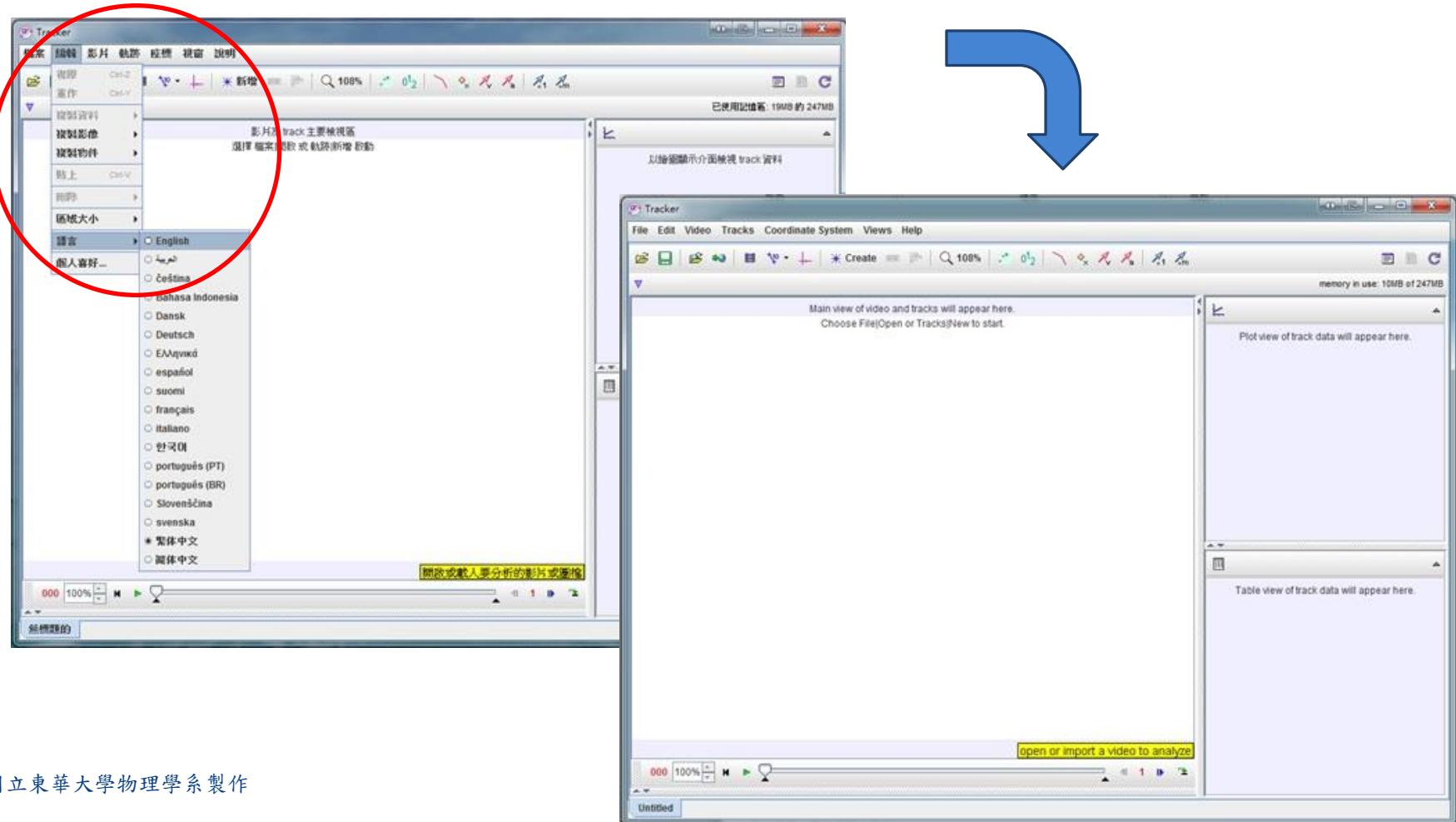
Tracker Software

103年11月 Department of Physics, NDHU

Tracker Software

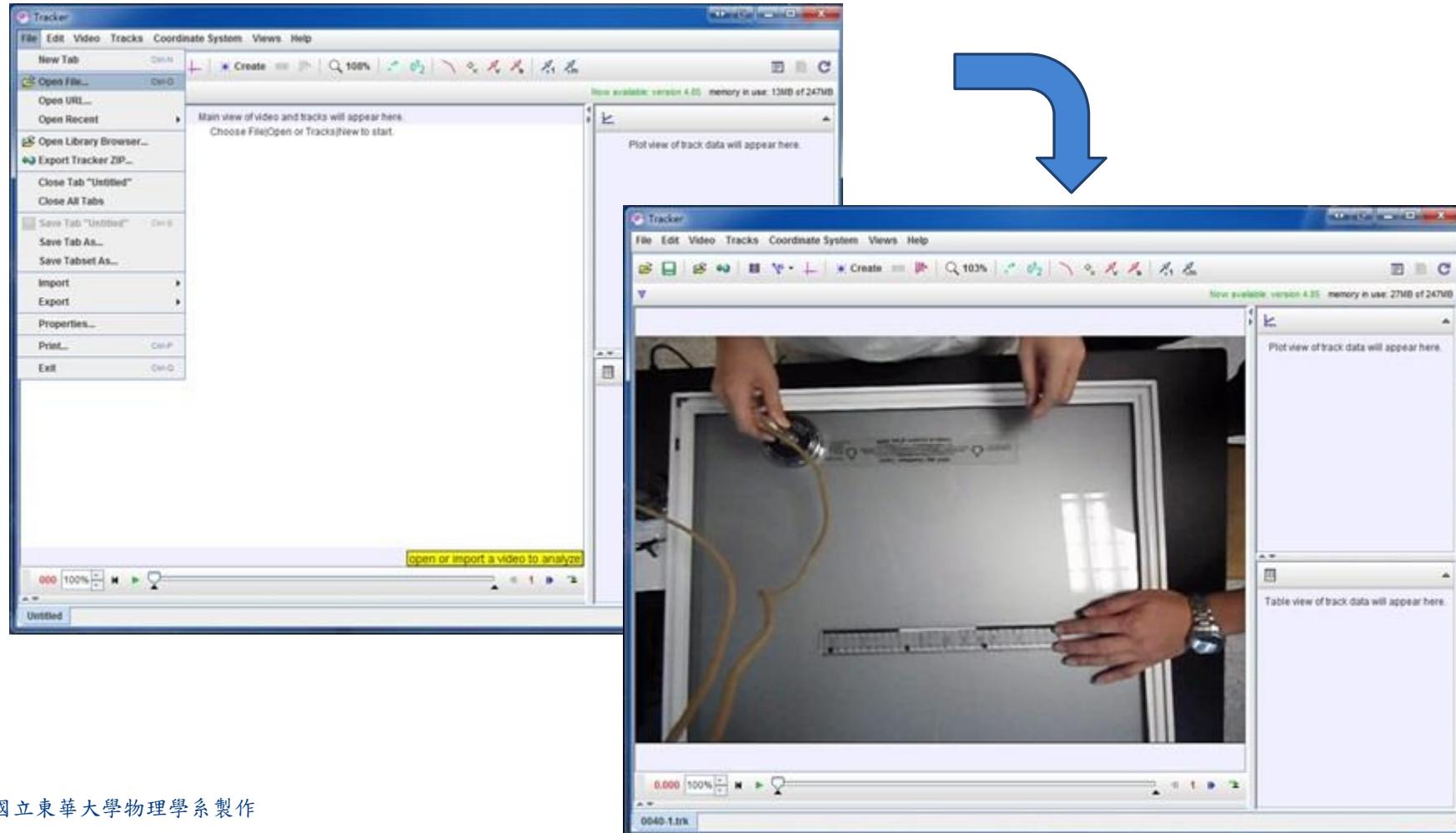
1. Tracker's main user interface。

1.1. Choose Language。【編輯(Edit)→語言(Language)→English】

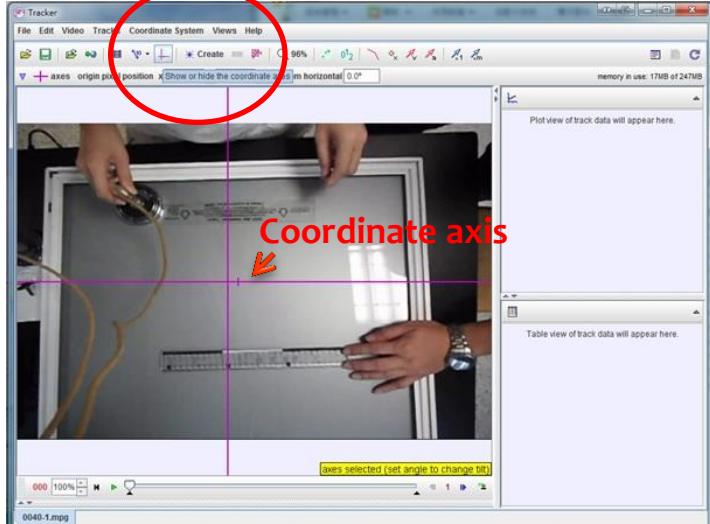


2. Open the files。

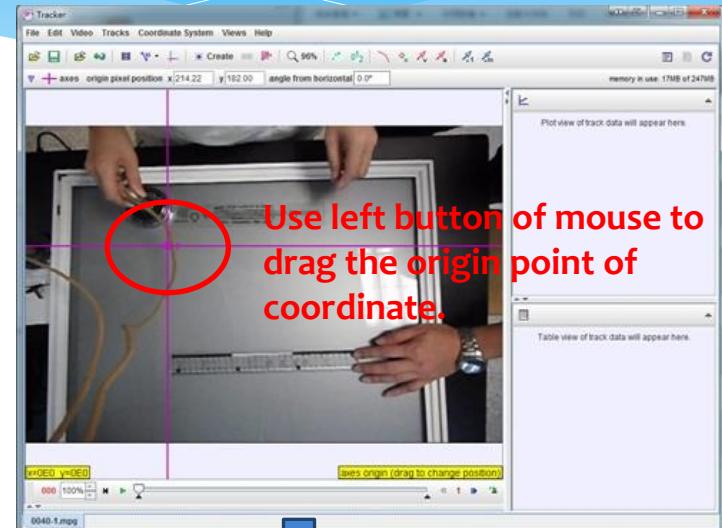
【File→Open File...→Video→Open (or by using your mouse to drag the video into the interface)】



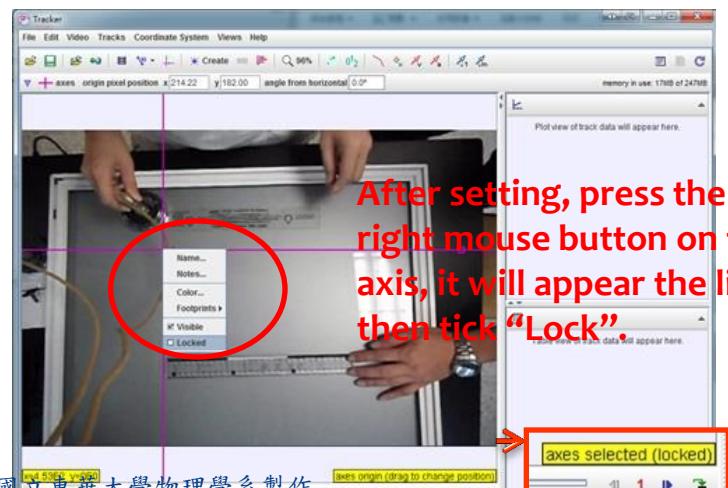
3. Set coordinate : Coordinate axis setting



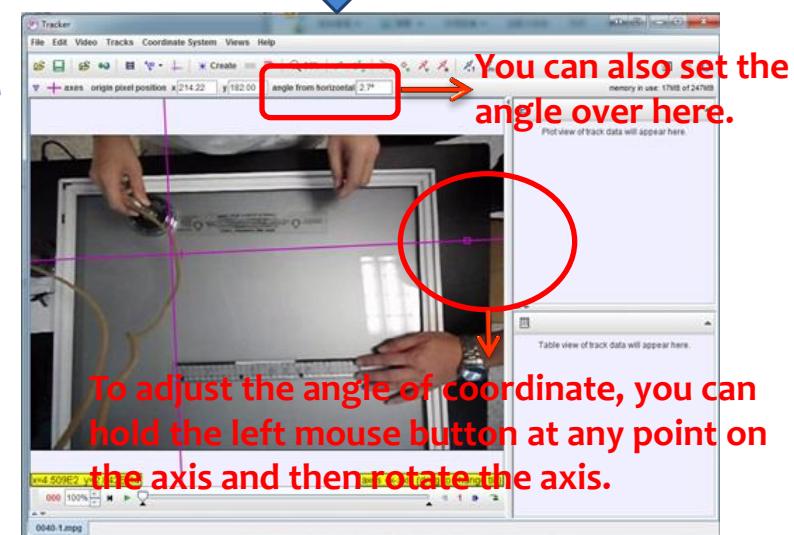
【Origin of coordinate Setting】



【Tilt setting】

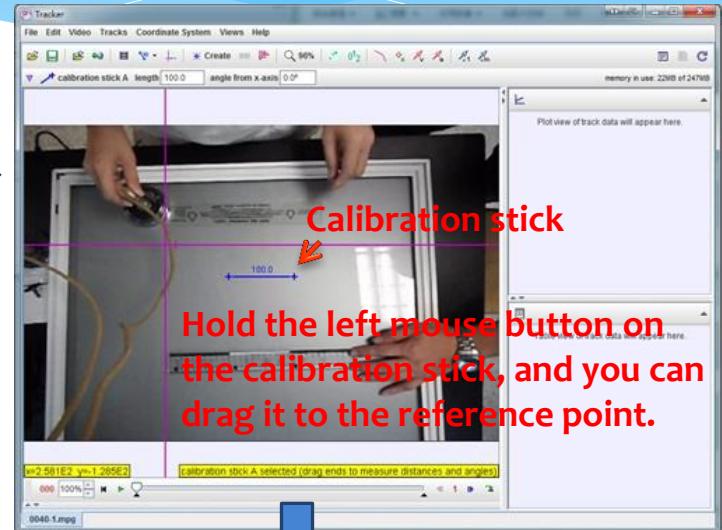
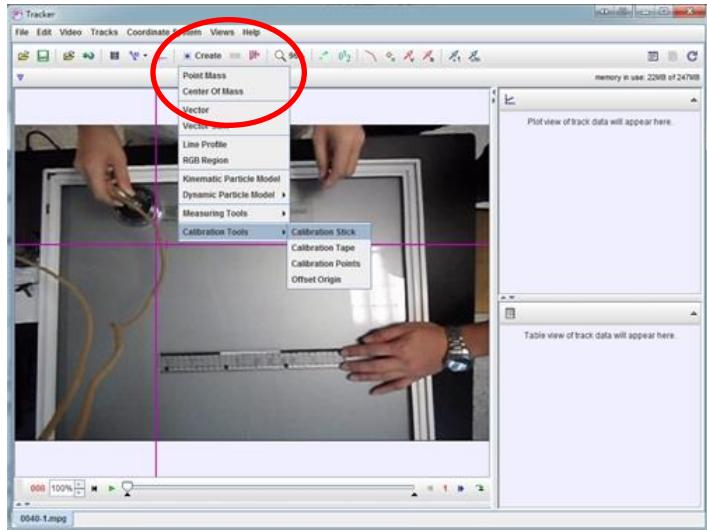


【Lock coordinate setting】

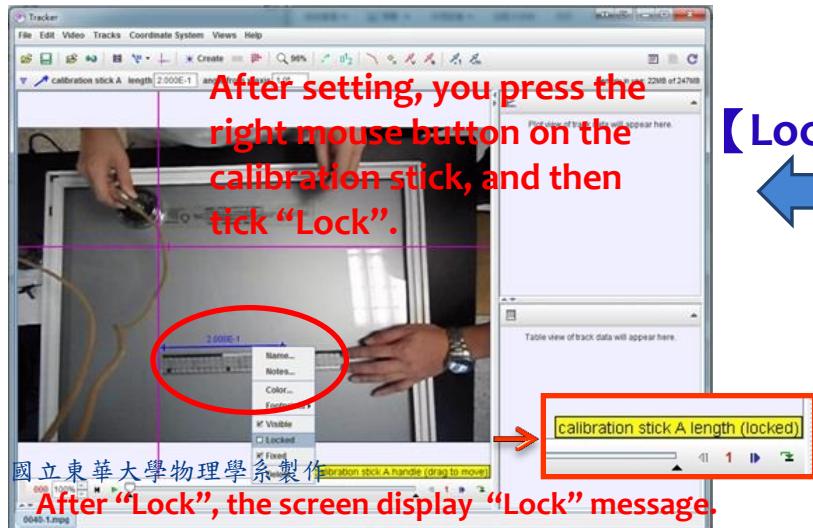


To adjust the angle of coordinate, you can hold the left mouse button at any point on the axis and then rotate the axis.

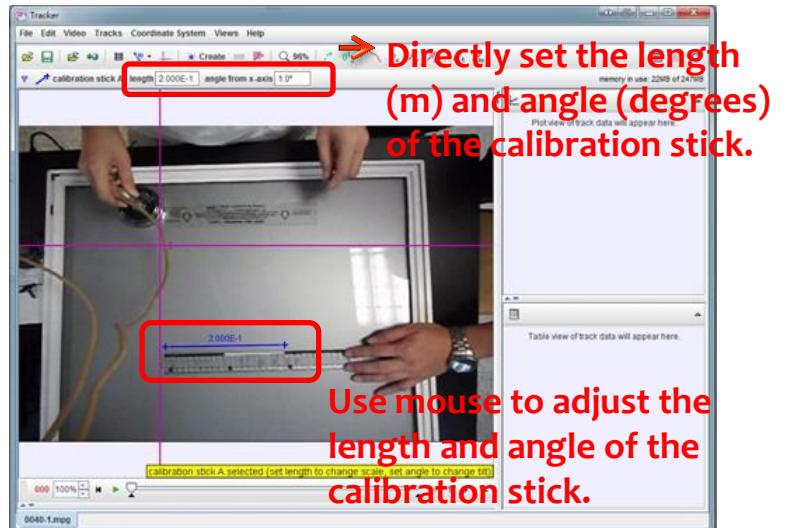
4. Set scale bar ◦ 【Toolbar Create → Calibration Tools → Calibration stick】



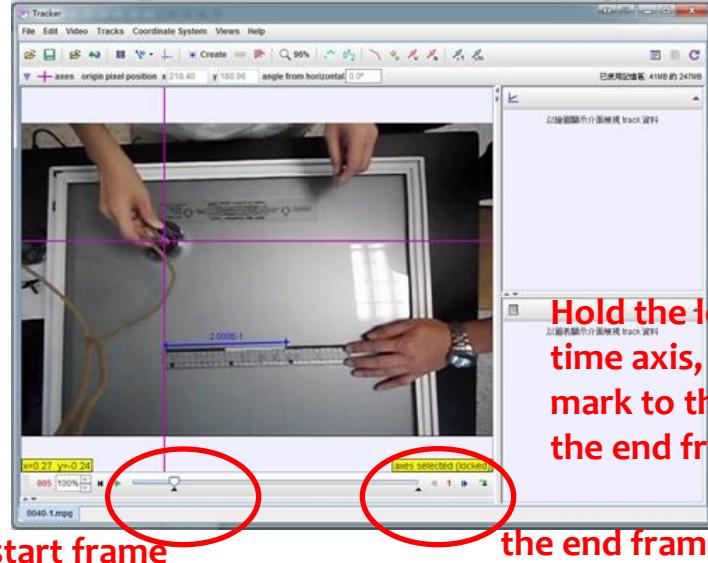
【Length setting】



【Lock setting】

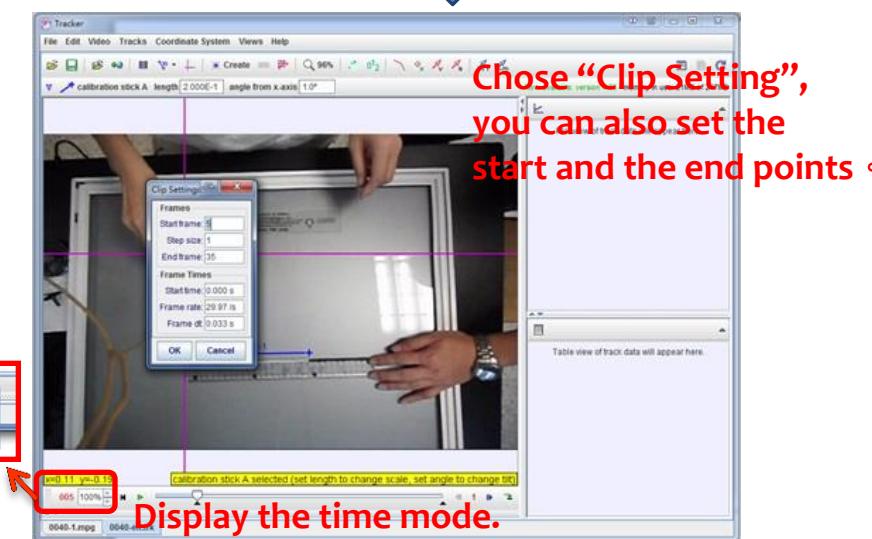
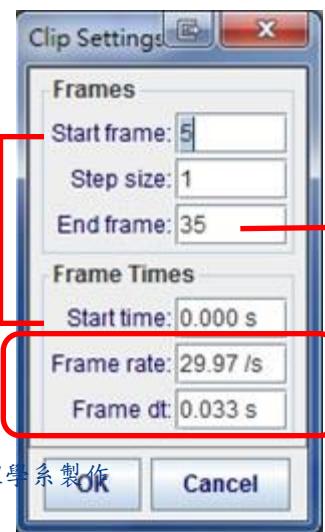
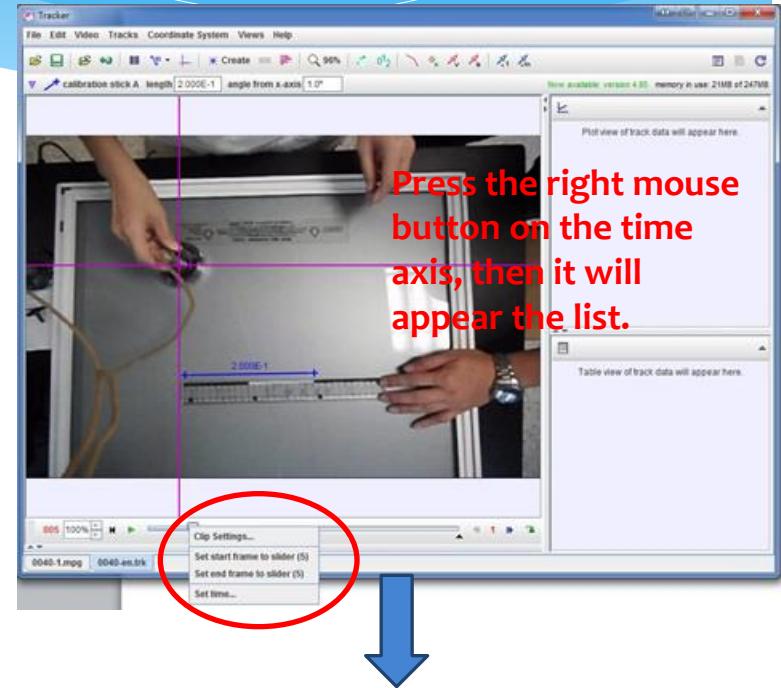


5. Set time axis。

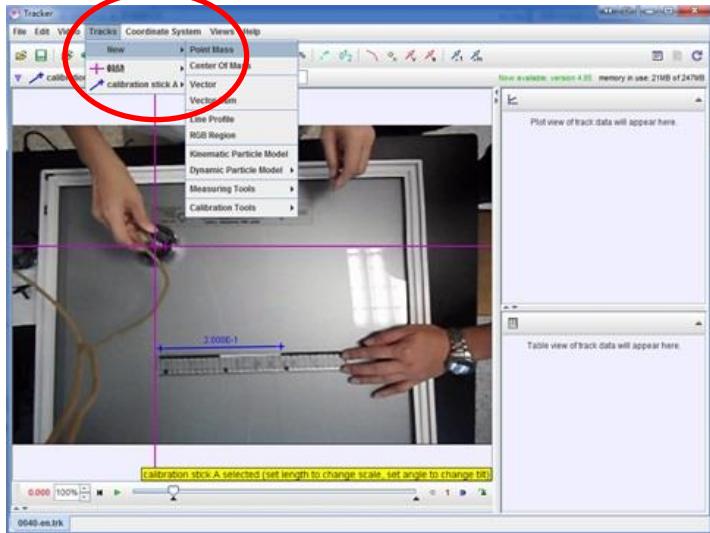


(Time setting)

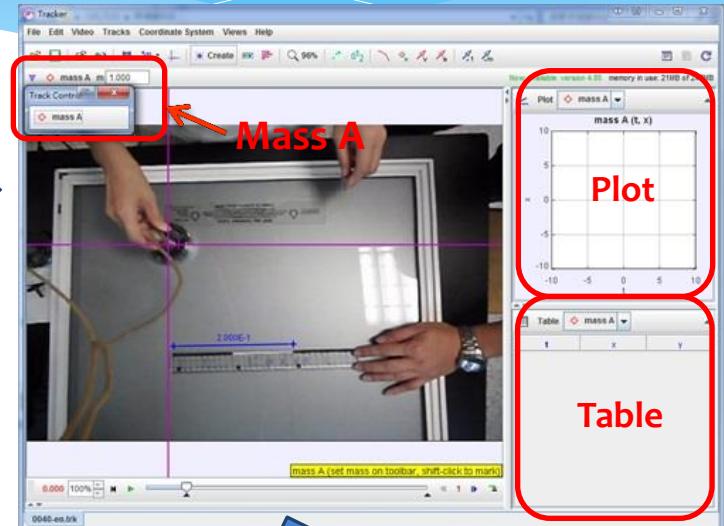
Hold the left mouse on the time axis, and drag the mark to the start frame and the end frame.



6. Track object's trajectories---Point Mass 【Toolbar Tracks→New →Point Mass】



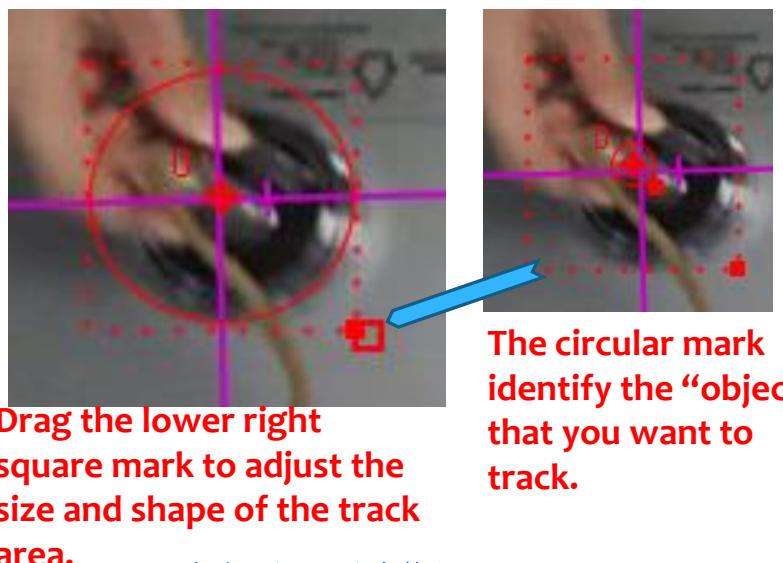
【Point Mass】



Mass A

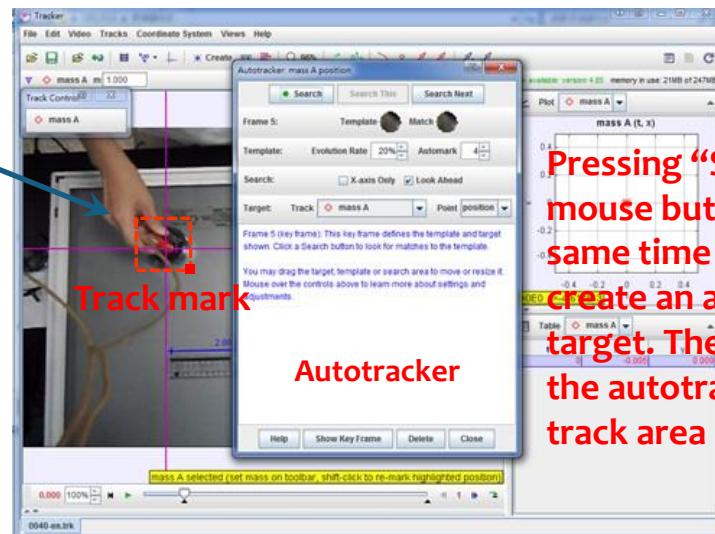
Plot

Table



The circular mark identify the “object” that you want to track.

Drag the lower right square mark to adjust the size and shape of the track area.



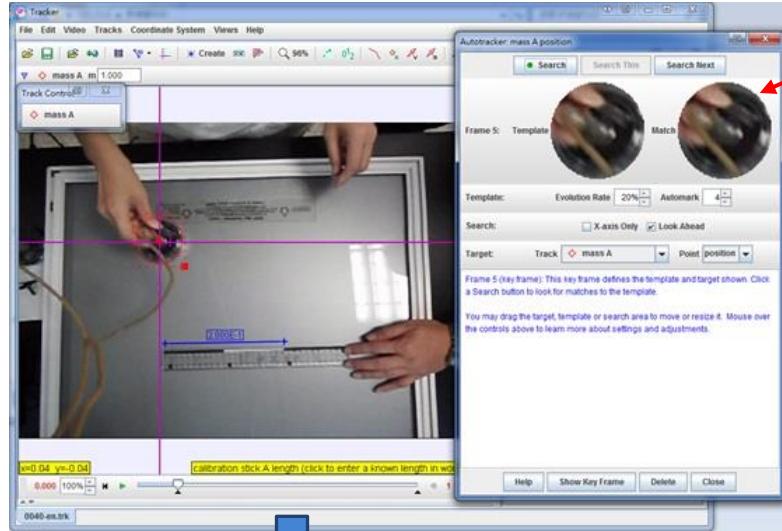
Track mark

Autotracker

Pressing “Shift+Ctrl+left mouse button ” at the same time on Mass A to create an area around the target. Then it will show the autotracker and the track area (dash line).

6.Tracked object trajectories--Point Mass

The “object” that you identify

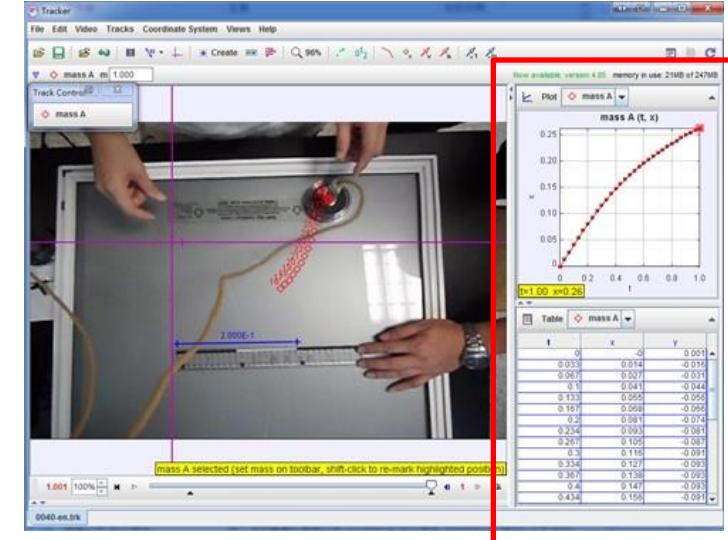
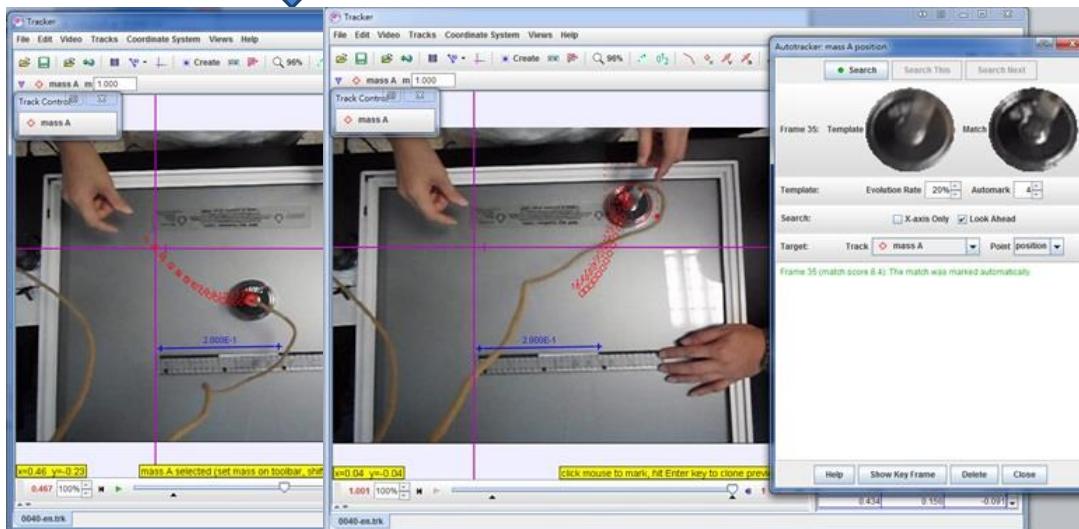


After setting object and track area, press “Search”. It will automatically search for the position (x,y) of the object in each frame. The position is also shown on the right chart.

If the identification (auto-track) is error, you can move the position mark (cross) to a correct location. Then choose “Accept” or “Skip”.

Make sure all position is correct, and then press “Close”.

Finally, do data analysis.



7. Data processing and analysis

Methods of data analysis :

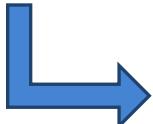
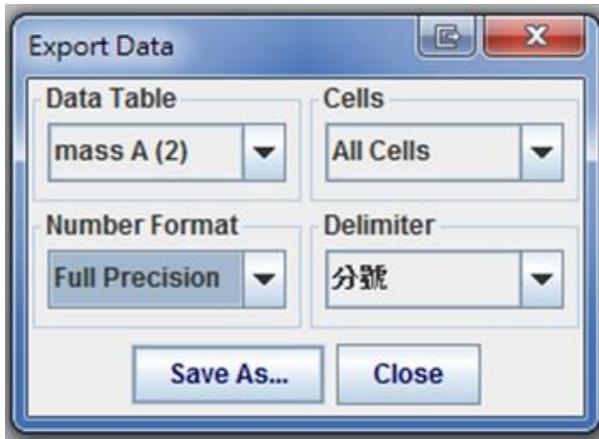
I. External program (ex : Excel、Origin...)。

II. Internal program。

Method I :

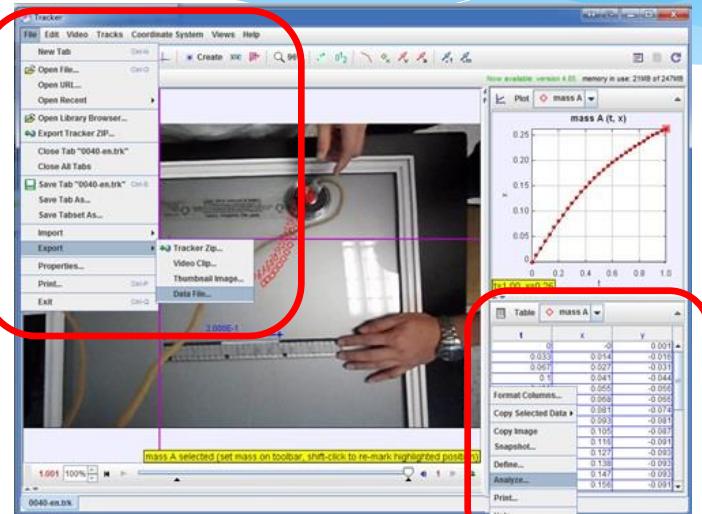
Toolbar File → Export → Data File → Save As...。

Saving the file, and then to use the external program.

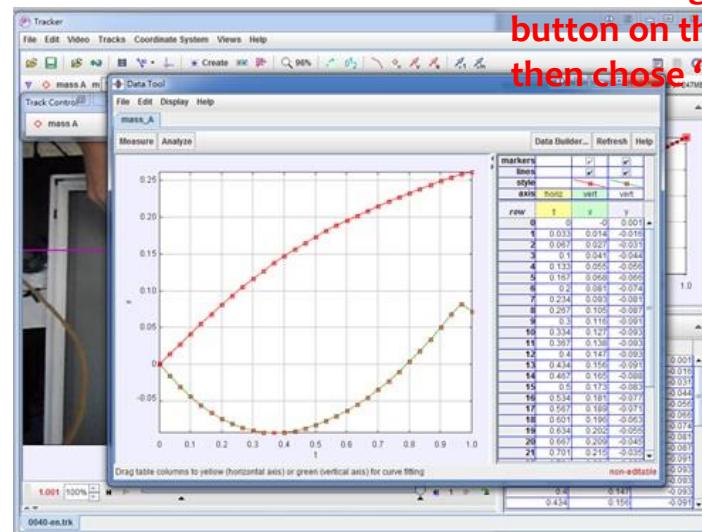


Export format

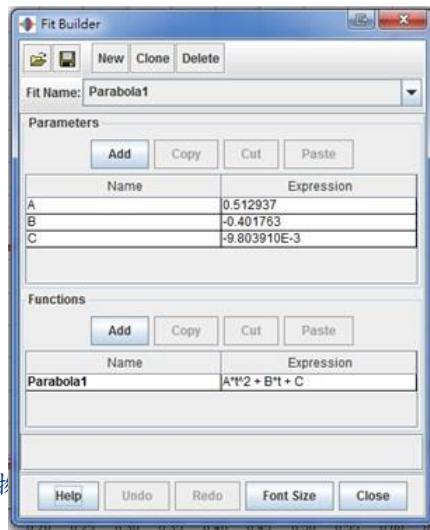
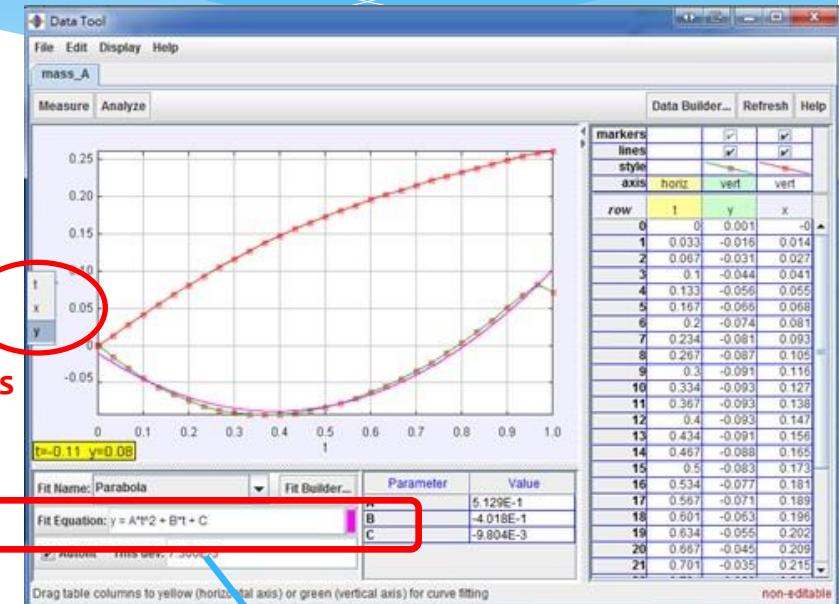
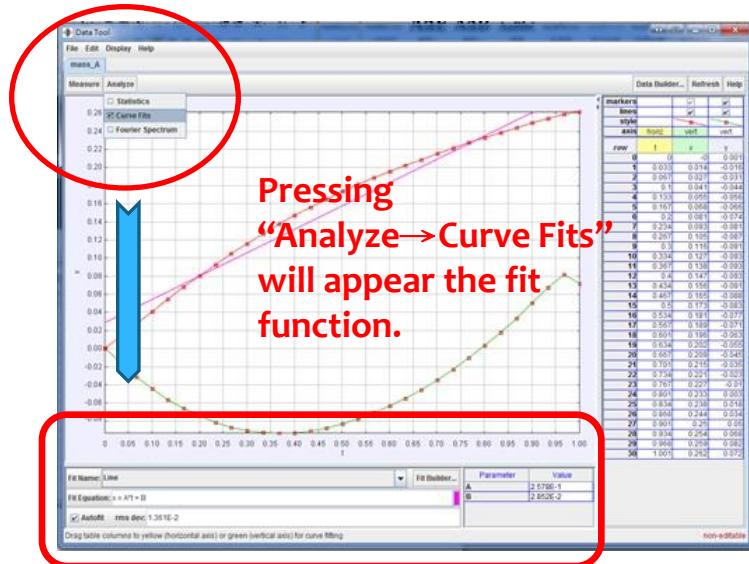
```
123 - 記事本  
編集(F) 搭配(E) 格式(O) 檢視(V) 說明(H)  
質量_A  
t;x;y  
0.00000000E+0;6.448472904E-4;7.167790693E-4  
3.00000000E-2;1.418446641E-2;-1.641750508E-2  
6.673333333E-2;2.774639495E-2;-3.173630419E-2  
1.00100000E-1;4.104904548E-2;-4.559025169E-2  
1.334666667E-1;5.449426164E-2;-5.834056184E-2  
1.668333333E-1;6.768537512E-2;-6.887964681E-2  
2.00200000E-1;8.041890369E-2;-7.754214095E-2  
2.335666667E-1;9.215624518E-2;-8.520622039E-2  
2.669333333E-1;1.040526759E-1;-9.085305393E-2  
3.00000000E-1;1.151567646E-1;-9.494585784E-2  
3.536666667E-1;1.262016135E-1;-9.731827887E-2  
3.670333333E-1;1.369420322E-1;-9.809633528E-2  
4.00400000E-1;1.463542416E-1;-9.788142455E-2
```



Method II :
Press the right mouse button on the Table and then chose "analyze".



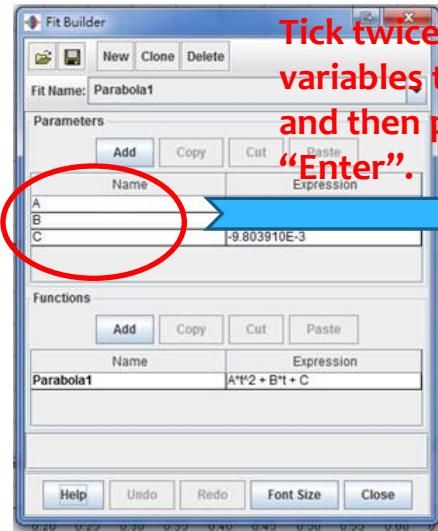
7. Data processing and analysis



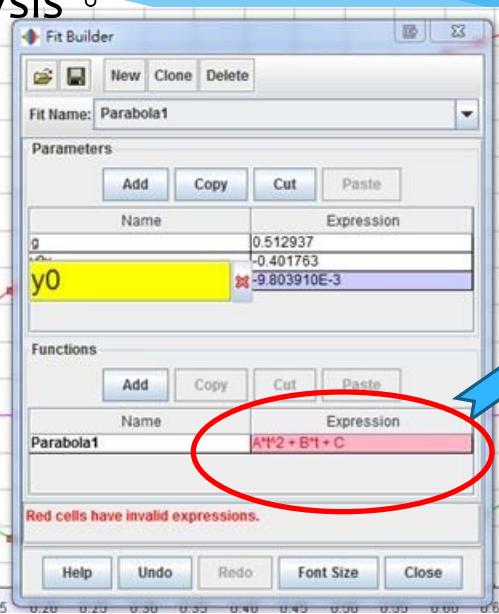
Tick twice on the fitting equation will appear “Fit Builder”, then edit the parameters of the equation.



7. Data processing and analysis

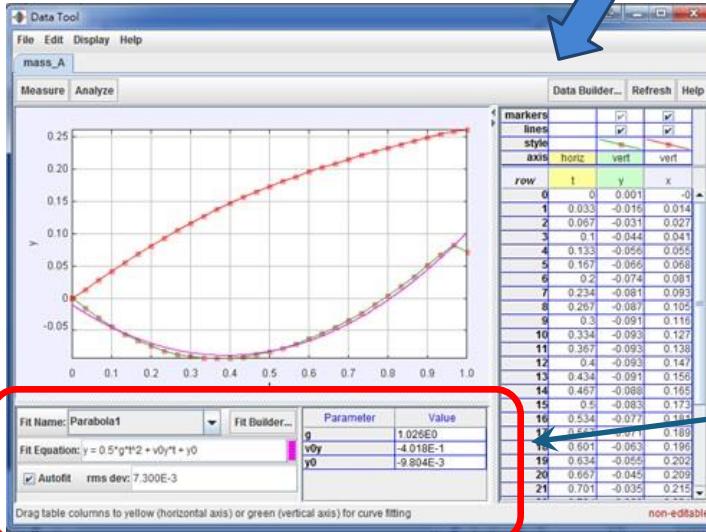
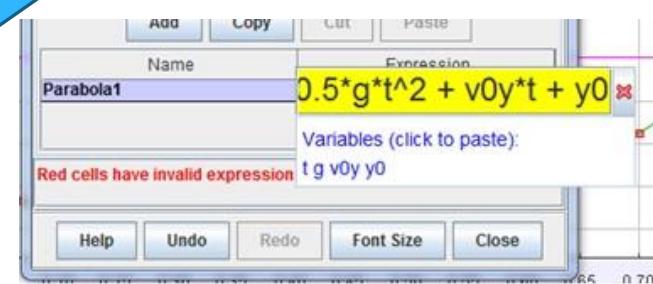


Tick twice on the variables to edit, and then press “Enter”.



Choose a proper variable name.
Easy to understand the fitting equation.

Tick twice on the equation to edit, and then press “Enter”.



Fit Name: Parabola		Fit Builder...	
Fit Equation: $y = A*t^2 + B*t + C$		Parameter Value	
<input checked="" type="checkbox"/> Autofit	rms dev: 7.300E-3	A	5.129E-1
		B	-4.018E-1
		C	-9.804E-3

Drag table columns to yellow (horizontal axis) or green (vertical axis) for curve fitting

Fit Name: Parabola1		Fit Builder...	
Fit Equation: $y = 0.5*g*t^2 + v0y*t + y0$		Parameter Value	
<input checked="" type="checkbox"/> Autofit	rms dev: 7.300E-3	g	1.026E0
		v0y	-4.018E-1
		y0	-9.804E-3

Drag table columns to yellow (horizontal axis) or green (vertical axis) for curve fitting

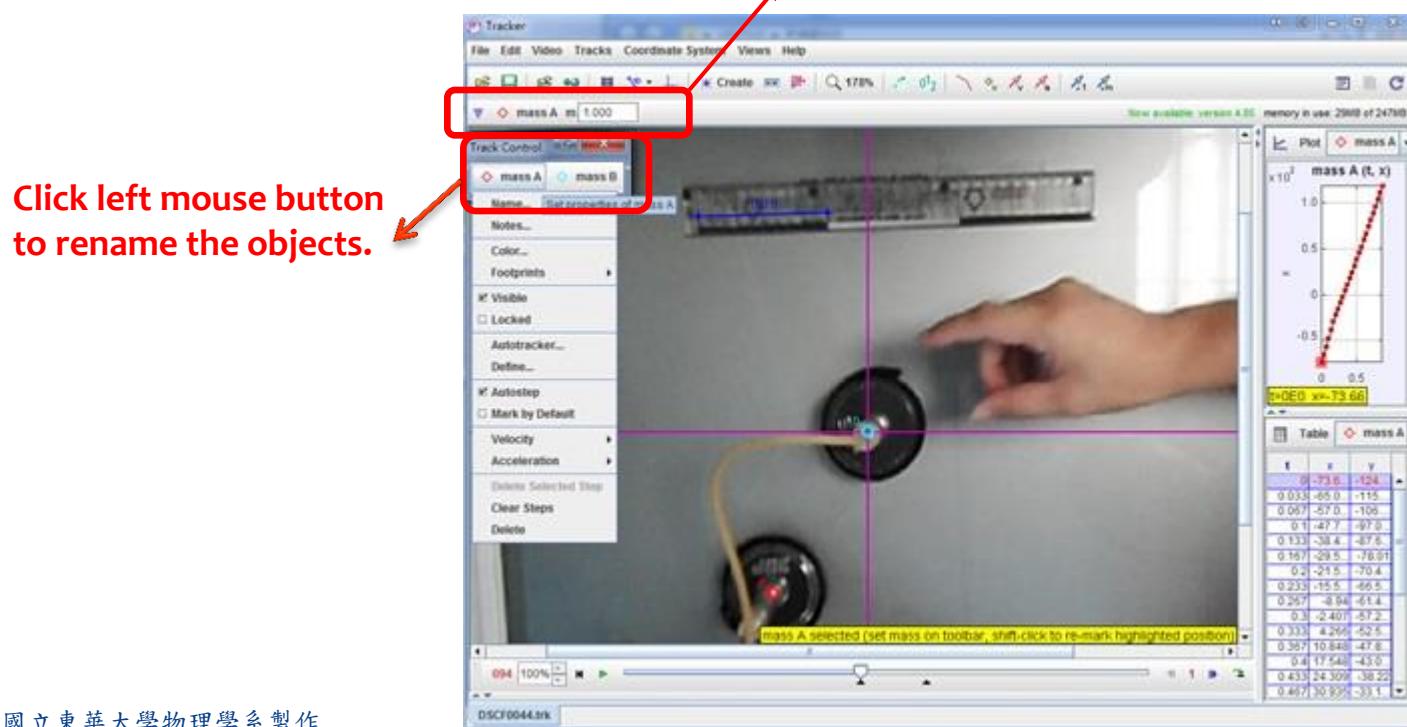
Before the edit of the variable name

After the edit of the variable name

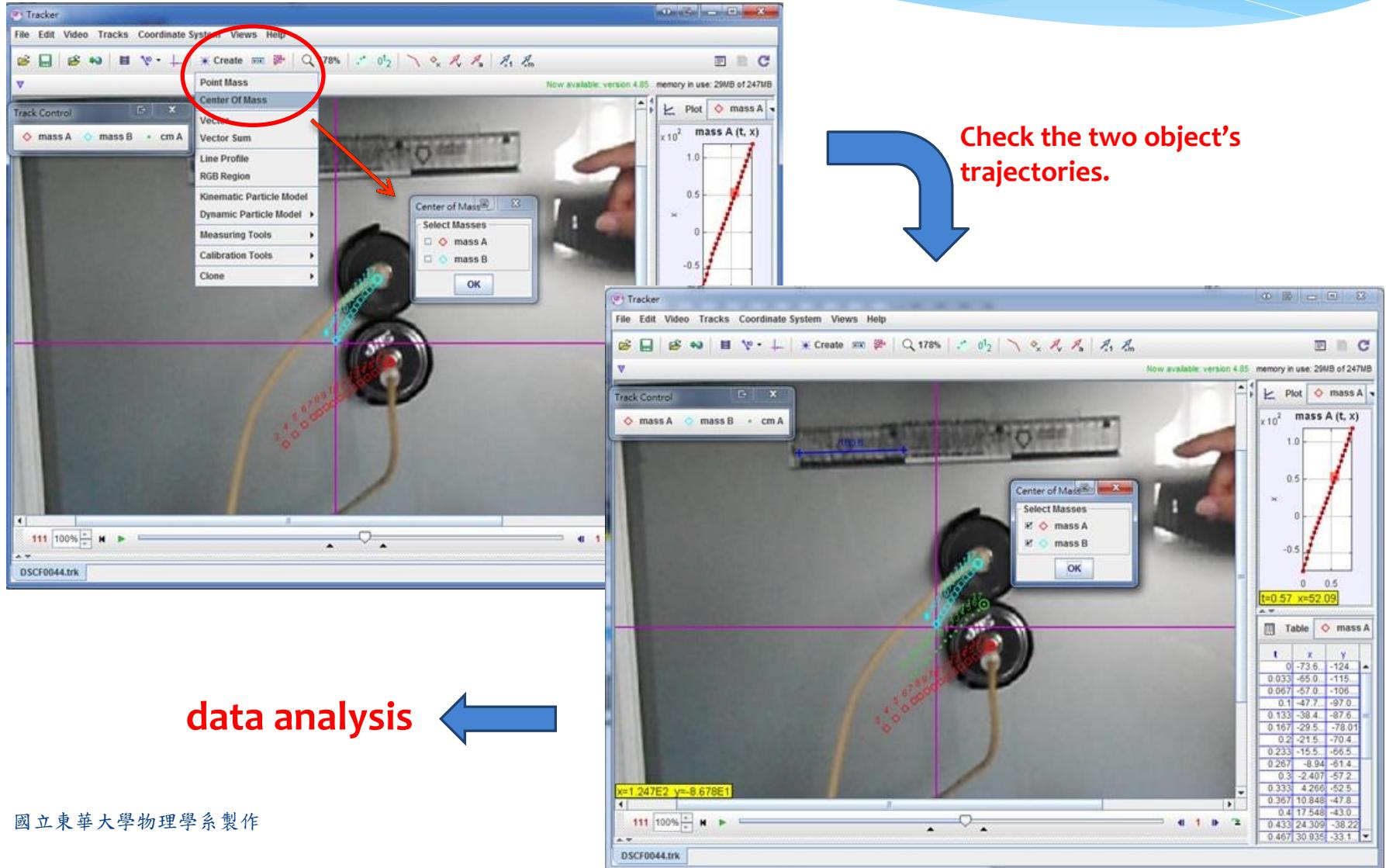
Two Dimensional collision : Tracker Software

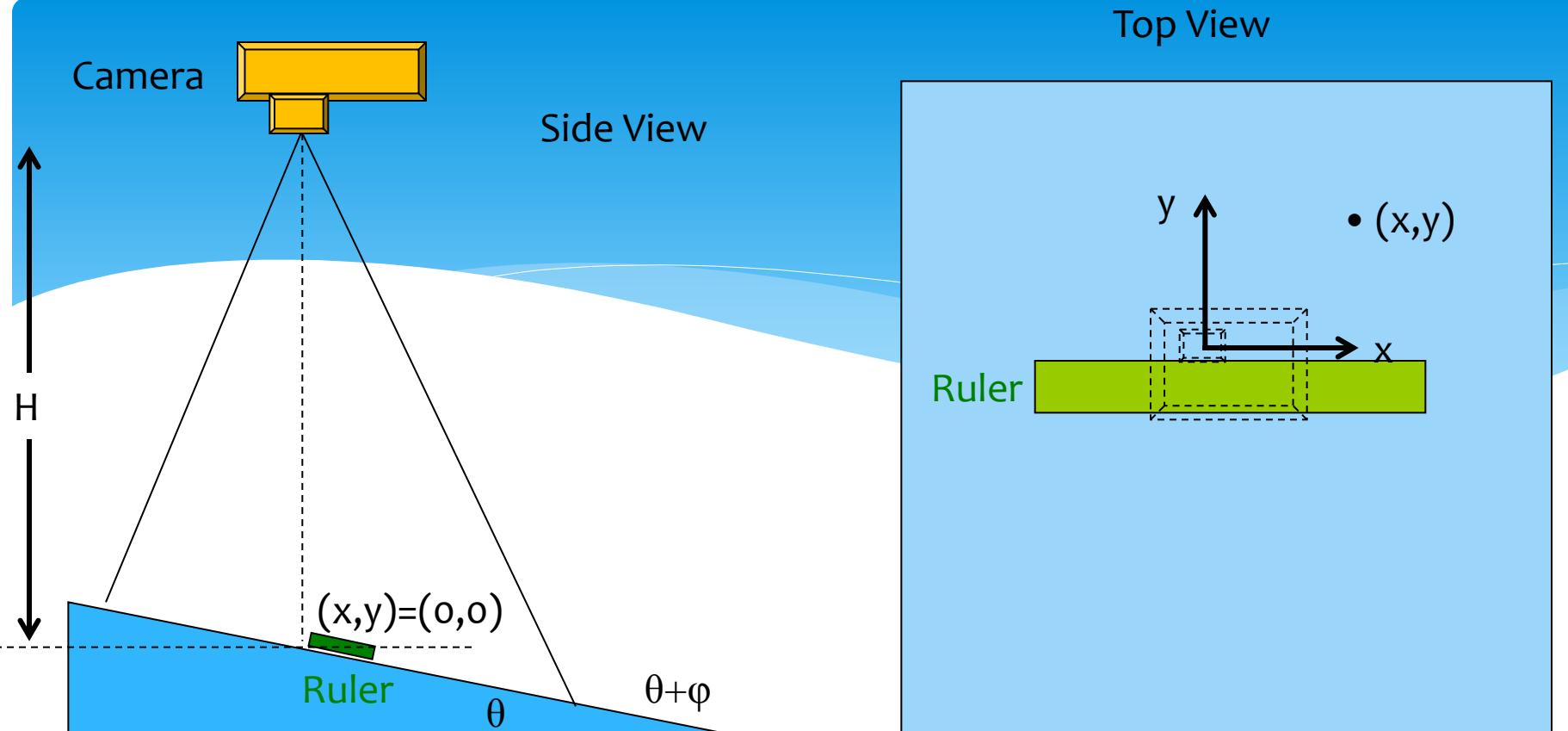
1. Tracker's main user interface。
2. Open the files。【File→Open File...→Video→Open)】
3. Set coordinate and time。
4. Create **Two Point Mass**

Set the mass of each object (unit: kg).



5. Tracked object trajectories---Center of Mass ° 【Toolbar Tracks→New→Center of Mass】





For small x, y ($\ll H$), and small θ

$$x_{\text{real}} \approx A \tan(x_{\text{measure}}/A), \text{ here } A \approx H/\cos(y_{\text{measure}}/H)$$

$$y_{\text{real}} \approx B \tan(y_{\text{measure}}/B)/\cos \theta, \text{ here } B \approx H/\cos(x_{\text{measure}}/H)$$