How to start the macro:

1. Go to "Windows" - "Panel Macros" - "curv_ini"; or input curv_ini() in the command line.

2. Input the data name to apply curvature.

3. Click buttons (9)-(15) to display the corresponding intensity plots.

4. Adjust the parameters (4)-(8) for a better visualization.

Instructions for the buttons:

(1) Press this button to input a data name for curvature.

(2) If the 2D UPDATE (3) check box is not checked, you need to press this button to update 2D curvature when EDC or MDC smooth parameters (4) are changed.

(3) Whether or not to update 2D curvature automatically when changing smooth parameters (4).

(4) Smooth parameters for EDC and MDC correspondingly. 2D curvature also uses these smooth parameters.

(5) Change the MDC weight in the 2D curvature formula. Zero means ignoring. +N means N times bigger. -N means 1/N or N times smaller.

(6) EDC band width factor in curvature. Use smaller number for a sharper band.

(7) The same as (6), but for MDCs.

(8) The same as (7), but in 2D.

(9) Display the raw data.

(10)-(12) Display the curvature results for EDC, MDC and 2D, respectively.

(13)-(14) Display the second derivative results for EDC, MDC and 2D, respectively.

About the parameters:

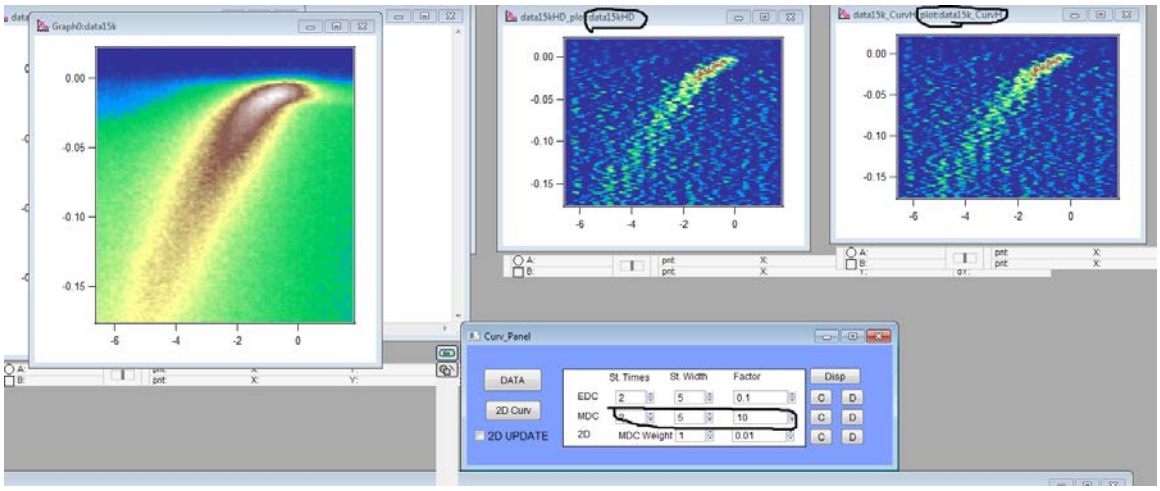
1. Smooth parameters (4): we use boxcar smooth here.

2. Factors (6)-(7): This is the arbitrary constant in the formula (a0 in *Z. Peng et al.*, Rev. Sci. Instrum. **82**, 043712 (2011)). You may have to use big smooth parameters for very small factors.

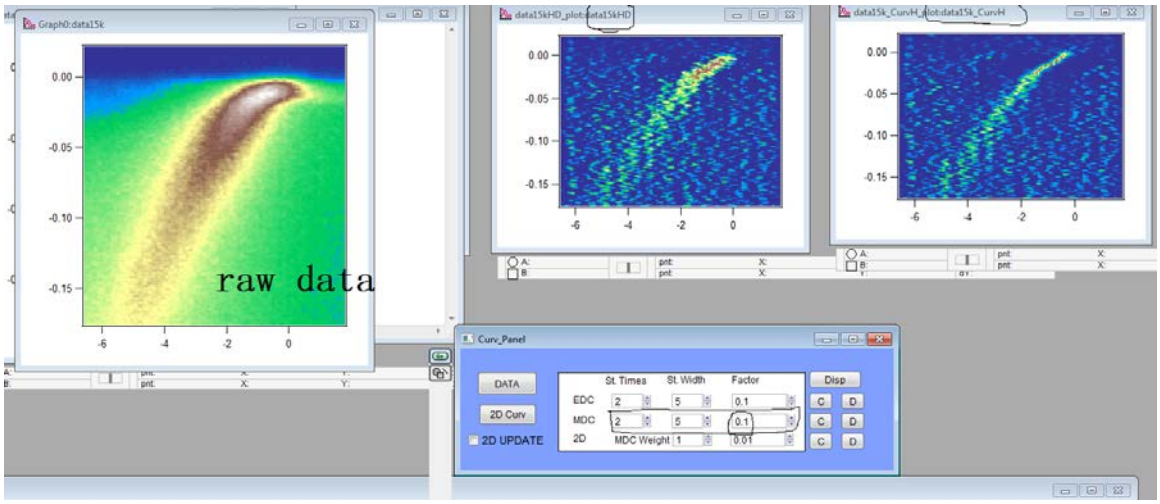
3. Factor (8): Since the formula is quite different from the 1D case, this factor could be very small compared to the 1D factor.

4. MDC weight (5): In some cases, the MDC and EDC weights are arbitrary (in *Z. Peng et al.*, Rev. Sci. Instrum. **82**, 043712 (2011)). This is the reason why we can adjust the MDC weight here. However, the default value should be the best.

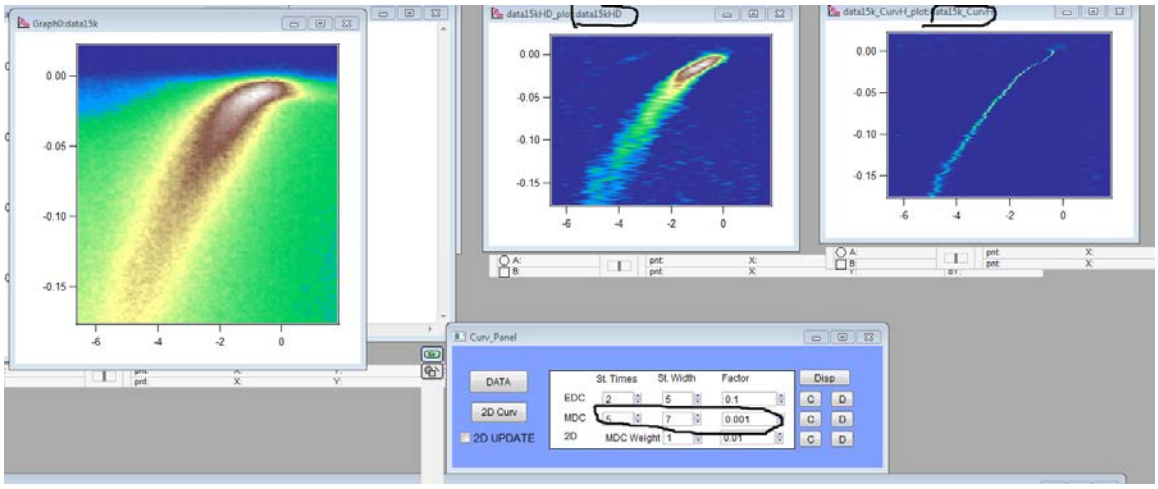
Examples:



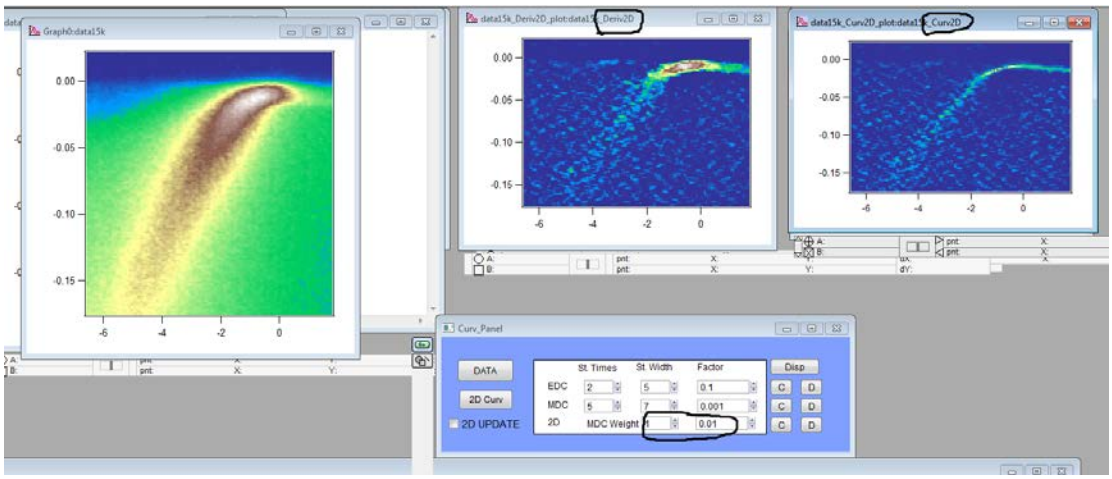
When the factor is big, for instance 10, the curvature will be the same as the second derivative.



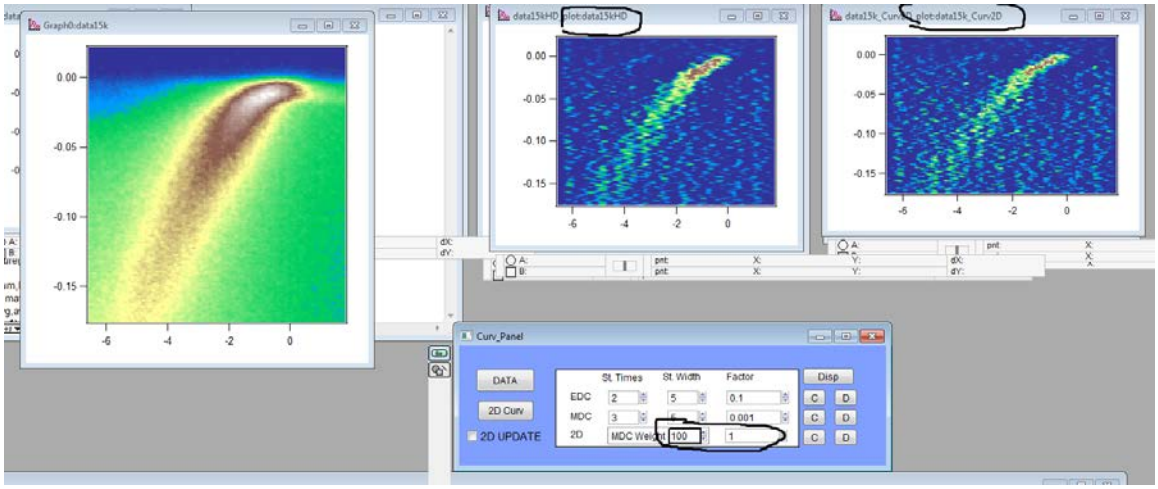
When factor is smaller, the curvature will be sharper.



If you use a very small factors, you may have to increase smooth parameters.



An example of 2D curvature (SC state data). The 1D curvature can be applied to any data. However, the result of 2D curvature will depend on data.



If the MDC weight is very big, the 2D curvature will be the same as the MDC curvature. If it is very small (for example, -100), the 2D curvature will be the same as the EDC one.