

NAME

setpowder – configure powder-averaged scans

DESCRIPTION

The `setpowder` macro is used to turn the powder-average mode on or off. Its usage is:

`setpowder motor full_width` – turns powder mode on, sets parameters.

`setpowder off` – turns powder mode off.

`setpowder uni` – turns unidirectional scanning on.

`setpowder -uni` – turns bidirectional scanning on.

`setpowder` – turns powder mode on, asks for parameters.

When powder mode is on, the powder motor will be rocked the full width specified at each point in a scan. Counts will be accumulated while the motor is moving. Powder mode works with all the angle scans and the *HKL* scans.

The syntax for invoking scans remains unchanged. You must still give the count-time parameter, although its value is only used to select the order in which the time and monitor counts are recorded for each data point in the data file. (In the future, the count-time parameter may be used to set the motor velocity.)

By default, the motors are rocked at the base rate as configured in the *config* file or set by the "base_rate" `motor_par()` parameter. To accommodate a faster rocking speed that requires accelerating from a base rate or a powder speed different from the base rate, the following `motor_par()` motor parameters are available (as of *spec* release 5.05.05-1): "powder_base", "powder_slew" and "powder_acceleration". The values for the first two parameters are set to the motor base rate and the last to the motor acceleration when *spec* starts up and on every `reconfig` command (or `config` macro invocation). If the "powder_slew" value is less than the "powder_base" value both the base and slew rates are set to the "powder_slew" value.

(Certain motor controllers, namely the 18011, CM3000, CM4000, E500, ES_OMS, ES_VPAP, HUB9000, IP28, MC4, MCB, SIX19, SMC and XRGCI_M, do not recognize the above parameters. Contact CSS to discuss the feasibility of adding support for the parameters for any of these controllers.)

By default, the powder mode moves the rocked motor in opposite directions at successive points to save time. If unidirectional mode is selected, the motor is scanned in the same direction for each point with the direction determined by the sign of the *full_width* parameter. The motor movements do not include backlash corrections in either case. At the end of the scan, or if the scan is aborted, the rocked motor will be returned to its position at the start of the scan, correcting for backlash, as of the powder-mode macros included in *spec* release 5.06.01-4. Prior to that, the rocked motor would be left at its last position without a backlash correction.

Powder mode works by redefining the macros `scan_move` and `scan_count` that are called at each point in a scan. The return to starting position of the rocked motor is accomplished using the `cleanup_once` and `spec_scan_tail` macros.