Software Tutorial for Mass Quantizer 2.0

The software correlates the rest masses of the elementary particles expressed in MeV with a chosen periodic fluctuation of energy. Some operative systems may require certain settings or supplementary programs to make the software compatible, as described in the appendix, where precautions and technical advice also is given.

Double-click on the program icon. Write on the first line the energy to which the particle masses should be referenced (=period) and press line feed once. A plain line feed yields the value 3600 MeV or any other previous value that has been memorized by the user. On the second line, write an integer, a point and one decimal followed by line feed: The decimal (0-2) sets the program to divide masses by period (0), square roots of masses by square root of period (1) or square of masses by square of period (2). The integer sets the choice of finer quantizations: Divide by 2^n (0), by n (1), $2 * n$ (2) or n times any other number (take that number as an integer). 'n' indicates the number of left-clicks on the text 'CLICK IN GRAPH' A plain line feed yields a zero (0.0) or any other value previously memorized by the user. After pressing line feed a colored input line appears with the option to save settings (letter + line feed). This opens a file MQREC.TXT in the same directory, to which data subsequently may be printed. Each time a letter is input on the colored line, the MCREC.TXT file will be over-written. Plain line feed preserves the file.

After the third line feed the sorted masses appear in columns at their projection value. Their names may be read by left-clicking on them and further data accessed by left-clicking on the appearing name. Left-clicking twice in a row (uninterrupted) on a particle displays dominant (or seen) decay channels in the form of yellow flashes. All particles need to be visible on the chart or else, some decay products may not be visualized. The sequence of flashes must complete before the program can be used for another task. Pressing the control-break key on a PC freezes the display, any other key un-freezes it.

The following symbol convention is used: Bosons on white background, mesons on black, leptons and initial period on blue, and resonance bosons on purple background. Neutral particles in blue color, charged ones in red, and both neutral and charged ones in magenta. The symbols mostly reflect phonetic or visual similarity with particle name or its first letter: Bb-mesons (b,m) Cc-mesons (c,n), proton (P), deuteronium, tritium (p), Helium ion (H), Litium ion (J,j), W-boson (W), half mass of W (w), exceptions; Lambda_0 (V) and my (y). Symbols that are not letters indicate visual similarity with some letter symbol, e.g. phi (/), mostly to indicate involvement of >1:st generation quarks, e.g. Lambda_C (&), Sigma_C ($), and Xi_C (∗).

Particles may be green-labeled for statistical analysis and selected or removed from the chart. To select or remove bulk (or just to inspect) right-click (twice may be necessary on speedy computers) to the far right on B for bosons, M for mesons U for content of up-quark, u for anti-up-quark (similarly for Dd, Ss, Cc, and Bb), T (not TM) for most stable particles that are listed by half-lives instead of widths, '-' for charged and possibly charged particles and ¡M to see from what quadrant the particles are projected. Any such selection or removal is done by right-clicking on appearing text 'SELECT' or 'REMOVE' followed

by left- or right-clicking on text 'CLICK IN GRAPH' and may be cancelled at any stage by right-clicking on 'RESET' at upper right. (Right-click four times in a row to select Bb and Cc-mesons. The symbols will then indicate first letter in particle name and Bb-mesons will appear on white background). Right-clicking on letters TM removes (T) or green-labels (M) particles starting from least stable; strike spacer key to interrupt and return to another program option. Quantum numbers may be green-labeled (and selected or removed) by first right clicking on blue square at lower left. Click once on selected features (making brown background) to label particles with any of the features or click twice (making red) to select particles that only display both features jointly. Selections must be either all brown or all red and should not be for mutually exclusive features. Right-click 3 times on feature to reset. After selection is complete, right-click 'SET' and proceed. The particles will then be moved to a finer quantization and their original position may be restored by right-clicking on text 'CLICK IN GRAPH'. Green-labeled particles may be reset by right clicking on the symbol '+' at the far right of the line of question marks. Any other selection (including invisible particles that have been removed) may be cleared by right-clicking on text 'RESET' or 'FLAVOR' at upper right. To select for statistical analysis, right-click first on the '+', then on each particle to be included or on the question mark under a column to be included entirely. Ver. 3.0 does not allow any mistaken selections. In later versions, right-click on any green-labeled particle again to un-select. After selection is complete, right-click on letters 'STD' and read results at upper left. At this point, requantize to another period equal to the statistical average by right-clicking colored 'RUN' and striking letter key 'P'. Retrieve original period by clearing green (+), selecting (right clicking, green-labeling) empty blue and requantizing once more via 'STD'. Particle properties in a column may be accessed by left-clicking on the question mark. First, right click on 'ERG' to make masses appear, 'DOM' to see dominant decays (percentage), 'HAL' to see half lives, and 'GAM' to see full width gamma.

The program prints numerical values of green-labeled particles to the MQREC.TXT file if one exists: Right-click on blue square at upper left center, write a short description ¡18 letters, and strike line feed to print. Leave the appearing yellow 'P' to print particle data in a sequence using the 'TM'-feature described above, these will then add to the most recent printout table. Each time a new green-labeled selection is printed, right click on the P and proceed as described above.

Right-click on the lower right blue square to track the particles rotation around the x-axis as the period moves from slightly lower to slightly higher than the selected period. At least one particle must be green-labeled to do this and the program module must have its original name 'NTUPLES' . The (usually hidden file extension) must be '.EXE'. A file named MQINT.TXT is then opened in the current directory with printouts of the results. A rotation of 20 steps must be completed before the program can be set for another task. Hit Pause/break key to inspect and then any other key to continue. Open another program module located in another folder for more extensive analysis of the observed distribution.

If the program locks for any reason, just remove any or all of the MQnnn.TXT files to start from the beginning, but that should not be necessary. If any particles appear as they

shouldn't, try and right-click on text 'CLICK IN GRAPH' or click on another particle and then once again on the one of interest. This program has been extensively tested for square roots (selection '0.1' on second line in opening window). Comparatively more errors and bugs possibly remain in Ver. 2.0 for the selections 0.0 and 0.2. Minor future improvements of the published program will be annotated as Ver. 2.1, 2.2 etc.

Appendix

The software should run on all operative systems equipped with MS-DOS, which includes Windows (R) versions up to and including Win Vista, 32bit. In Win. 2000, it may be necessary to disable 'quick-edit mode' in order to activate the mouse: Double-click on the program icon to open it, right-click on the upper frame, choose properties and disable quick edit mode on all applications of the same type. Then confirm new setting, close the program window, and open it again. In Win. Vista, it may be necessary to run program as administrator: Right-click on icon, chose 'compatibility' tab and set to run as administrator. There may also be security settings that have to be altered. Similar applies to Win. XP. Win. Vista 64bit needs a dos emulator run the program, the same may apply to several Linux distributions. Dos-emulators may be downloaded for free from e.g. www.dosbox.com and www.dosemu.org. The program should then be placed inside the dos-emulator environment in the appropriate folder. Both these sources have been tested for compatibility with this kind of program.

Do not leave the computer with the software window open. That may cause it to hang with a black screen when the screen saver is activated. If that happens, move the mouse or in the worst case, restart the computer using its reset button.