In the vectorised case the slope of the CPU time vs N is significantly lower than one. This can be explained by the vectorised gain at large vector size.

The calculations of the macroscopic variables and the gradients are more efficient (factor 20), while for the search of the neighbours only a factor 5 is observed. This method will be also more economical when the physical model includes a lot of phenomena as magnetic field, radiation transfer, etc.

During the run, the number of groups is adjusted by an automatic procedure. It calculates over three time-steps the number of groups that optimizes the CPU time. The organization of the code is given in Table I. It is interesting to compare the performances of the code for two initial distributions of density. We present in Table II the CPU times per step for calculations performed over 3×3 and 5×5 blocks with uniform and gaussian distributions. For the first one, since the number of neighbours is about the same for all particles it is preferable to use only one

TABLE I

Organisation of the Program