Define Reaction and Output

For reaction and output definitions, the general syntax is

```
command parameters
```

and in some cases

```
command(parameters)
```

Please refer to the "Alphabetic List of Commands" to get a full description of all commands. In the following, we discuss the most important ones, needed to define the reaction and the type of output.

One first needs to define the type of reaction to be simulated, via:

```
application reaction
```

where three types of reactions can be considered:

- electron positron annihilation (ee)
- decay of kinky string (kinky)
- hadronic scatterings (hadron), which includes pp, pA, and AA scattering

For example, in order to simulate pp or PbPb scattering, we need

```
application hadron
```

and to simulate electron-positron, we need

```
application ee
```

Then one has to specify the parameters of the reaction, which depends on the application. In case of 'application hadron', which covers proto-proton, proton-nucleus, and nucleus-nucleus scattering, we need to specify the projectile and target atomic and mass numbers via:

```
set laproj 1  ! projectile atomic number
set maproj 1  ! projectile mass number
set latarg 1  ! target atomic number
set matarg 1  ! target mass number
set ecms 7000 ! sqrt(s)_pp
```

where ecms is the energy in the center of mass expressed in GeV.

In all cases, we may define which resonances are prevented from decaying (per default, all decay).
This can be done via:

```
nodecays list_of_particle_ids end
```

see src/KWt/idt.dt for EPOS particle_id definitions.
For example, to prevent decays of neutral pions π_0 and K_s mesons, one needs

```
nodecays 110 20 end
```

Most importanty, we have to define what kind of output we want to have. Per default, no output is produced (making the simulation useless).

The command:

```
set ihepmc 1
```

will produce output in HepMC format, the corresponding file being z-*name*.hepmc in the directory $CHK.

But one needs in addition to run epos with the **-hepmc** option as:

```
$EPO/script/epos -hepmc name.optns
```

Please refer to the Install instructions (https://klaus.pages.in2p3.fr/epos4/code/install) to get the definitions of the environment variables **CHK** and **EPO**.

The command:

```
fillTree4(centrality)
```

will produce output in ROOT format, the corresponding file being z-*name*.root in the directory ***$CHK***. The parameter *centrality* refers to the centrality variable to be used, it should be C1 (impact parameter) or C2 (number of Pomerons).

But one also needs in addition to run epos with the **-root** option as:

```
$EPO/script/epos -root name.optns
```

The ROOT file is created in the directory **$CHK**.

The command:

```
print * 2
```

writes output of "level 2" into the file *z-name*.check in the directory **$CHK**. This means in particular several lists of particles produced at different stages of the collision.