

# A short introduction to QCDml

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The ILDG meta-data is split into two documents:

1. The *ensemble XML* document contains all parameters which remain unchanged for the whole Markov chain.
2. Other parameters are specific to one or a set of consecutive Markov steps and will be stored in a *configuration XML* document.

Any ILDG-compliant meta-data document has to conform to either the ensemble or the configuration XML schema. The schemata are developed and adopted by the metadata working group and affirmed by the proximate ILDG workshop. The current version is 1.3 and can be downloaded here:

- <http://www.lqcd.org/ildg/QCDml/ensemble1.3/QCDmlEnsemble1.3.0.xsd>
- <http://www.lqcd.org/ildg/QCDml/config1.3/QCDmlConfig1.3.0.xsd>

## 1 The ensemble XML

The ensemble XML document comprises of the following top-level elements:

**Management:** Information about the owning collaboration and the project name. Optionally an archive history list may be included.

**Physics:** Information about the physics parameters (see below).

**Algorithm:** Information on the algorithm is not standardised and the submitters are therefore requested to provide a reference to an publication and a glossary document which contains details on the listed parameters.

Most information is encoded in the element `physics` which comprises of the following child elements:

**Size** Information on the size of the simulation lattice.

**Action** Markup of the used action and its parameters (see below).

The markup of the action is most crucial for preserving extensibility. Within ILDG the following strategy has been adopted:

- Each action can be split into a gauge and a fermion action.
- The ensemble XML schema foresees an element `<generalGluonAction>` and an optional element `<generalQuarkAction>` which will be substituted by the actually used action.
- Actions which contain a structure which is the same as for a simpler action are ordered by an inheritance tree. For example, the clover fermion action is equivalent to the standard Wilson fermion action plus an improvement term.
- Actions which have the same structure in common are grouped. For instance, the Iwasaki and the Symanzik improved gauge actions only differ by the choice of the couplings.

This inheritance tree of possible actions is obviously extensible. Any action will be included into the schema only once to ensure uniqueness.

## 2 The configuration XML

The ensemble XML document comprises of the following top-level elements:

**Management** Includes a checksum for the binary configuration file and an option archive history list.

**Implementation** Information on the machine and code that had been used for generating the data.

**Algorithm** Optional additional, configuration dependent algorithmic parameters, which are not standardised but should be described in the glossary document defined in the ensemble XML document.

**Precision** Precision used for calculations (double, single or mixed).

**Markov step** This complex element contains references to the ensemble document (`markovChainURI`) and the binary configuration (`LFN`), configuration and run counters, plaquette value.

## References

- [1] C. M. Maynard and D. Pleiter, Nucl. Phys. Proc. Suppl. **140** (2005) 213 [arXiv:hep-lat/0409055].