

EMMO

European Multiperspective Material Ontology

<https://github.com/emmo-repo/EMMO>

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multiperspective - philosophical background

developed in collaboration between philosophers (bringing in the historic greek roots of $\acute{o}\nu\tau\omicron\lambda\omicron\gamma\acute{\iota}\alpha$, (quantum-)physics, material science and simulation

semiotics

semiotics is the study of meaning-making. It is the discipline of formulating something that possibly can exist in a defined space and time in the real world.

mereotopology

mereotopology is the combination of **mereology** (science of parthood) and **topology** (mathematical study of the geometrical properties and conservation through deformations). It is introduced via the Item class

physics

physical objects are embedded in 4D time-space continuum, sub-particle physics, quantum physics, atoms & molecules, simulation. Importance, e.g., for molecular mechanisms in chemical reactions

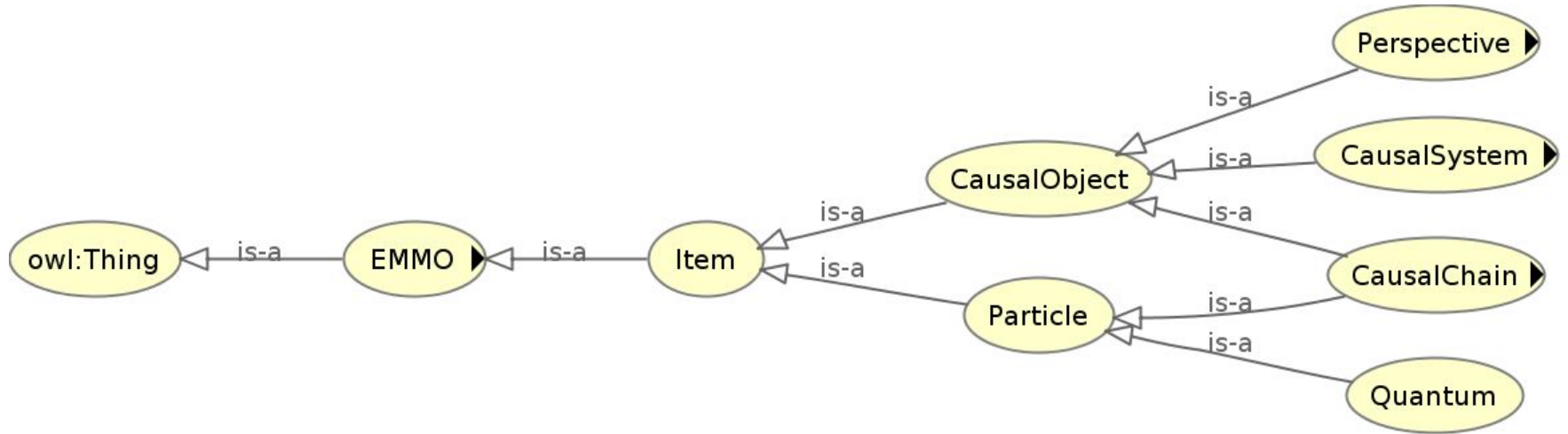
metrology

metrology is the science of measurements. It introduces units and links them to properties - based on the standards of International System of Quantities (ISQ) and International System of Units (SI).

→ it connects arts and sciences in its top-level ontology

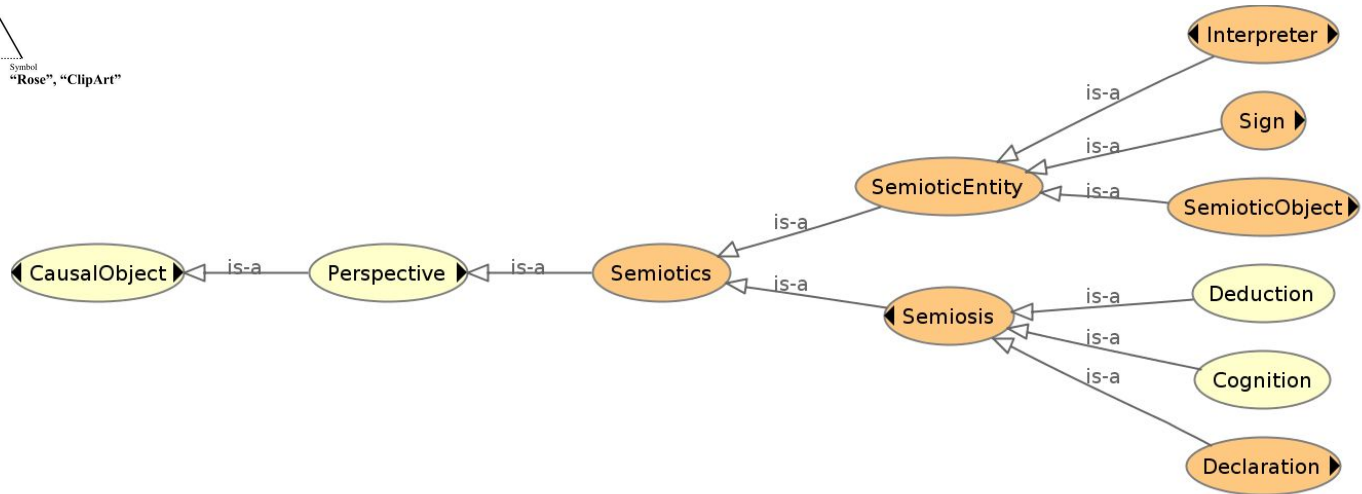
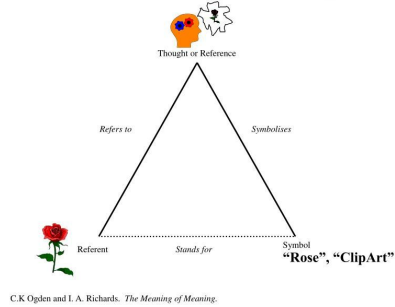
top-level: item

world is modeled as items

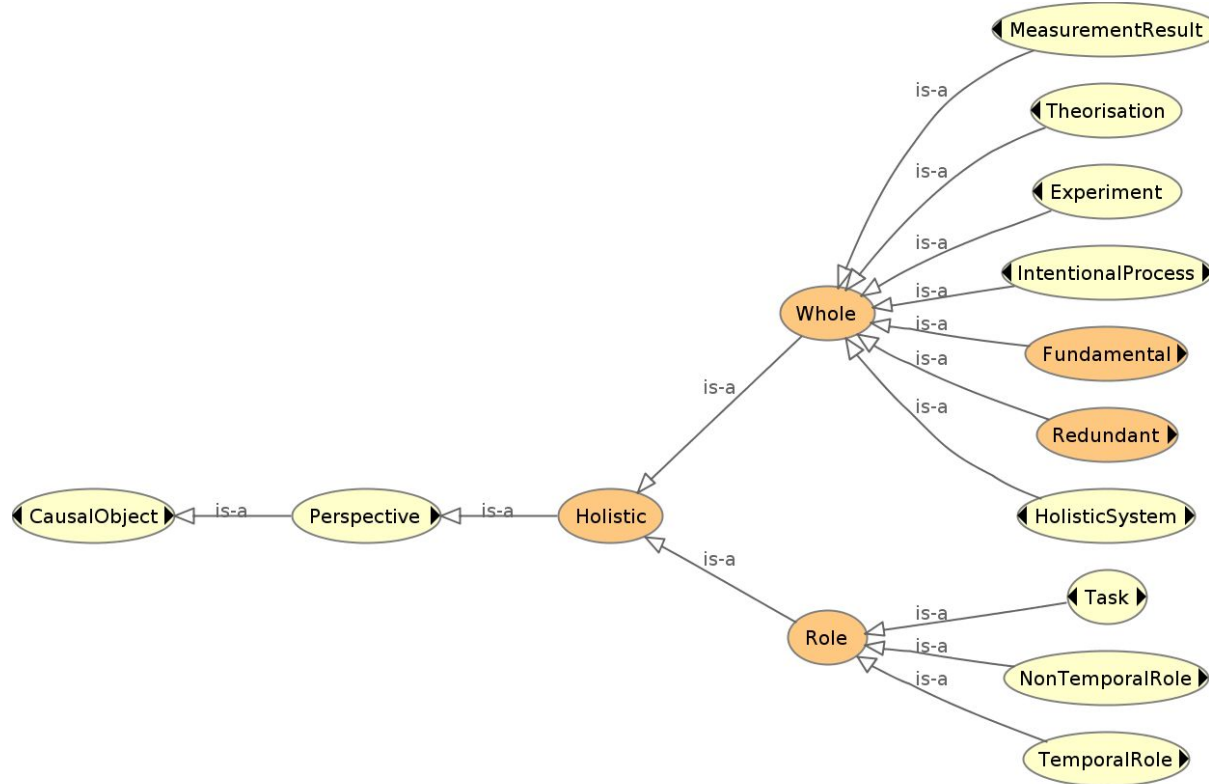


semiotic perspective

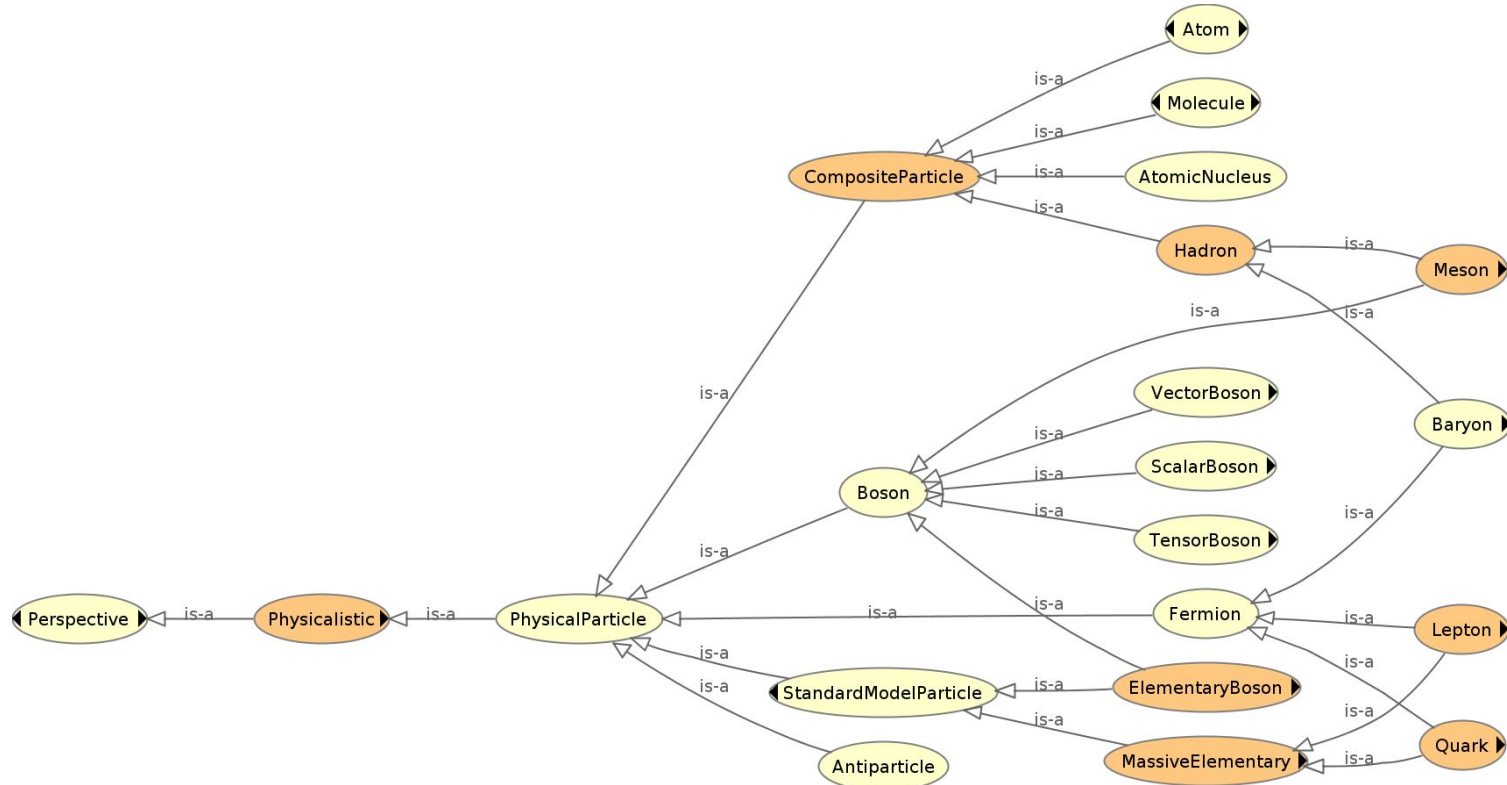
The Semiotic Triangle



mereological perspective (part-whole relations)



physicalistic perspective



python toolchain

EMMOntopy (<https://github.com/emmo-repo/EMMOntoPy>)

owlready2 based python class wrapper to EMMO ontology

- ontology development in pure python possible (no Protégé required)
 - OWL classes as python classes
- OWL verification
- graphical visualisation
- documentation

EMMOntoPy example

```
class ChemicalReaction(emmo.Process):
```

```
    """Chemical reaction"""
```

```
    wikipediaEntry = en("https://en.wikipedia.org/wiki/Volume")
```

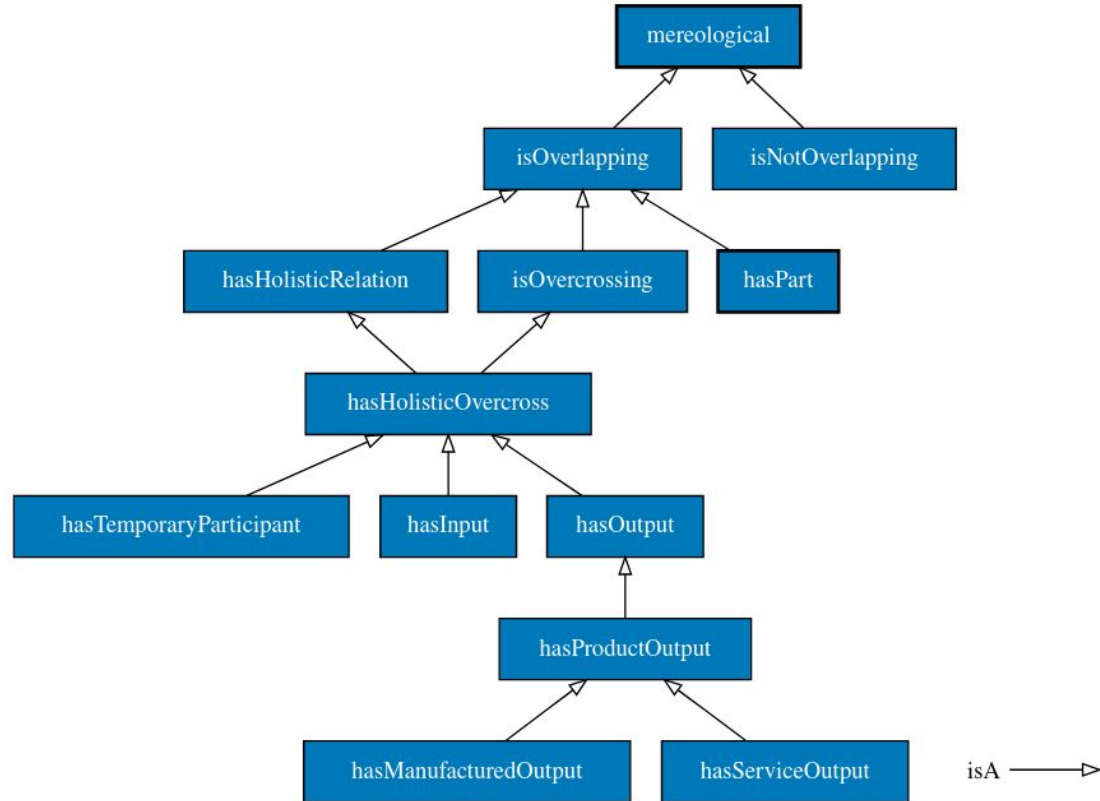

EMMOntoPy

- easy construction of domain ontologies
- interoperable with EMMO-mid and top-level ontology
- easy reasoning
- very important: ontologies have **no value on their own**, they need to be used in an suited software infrastructure

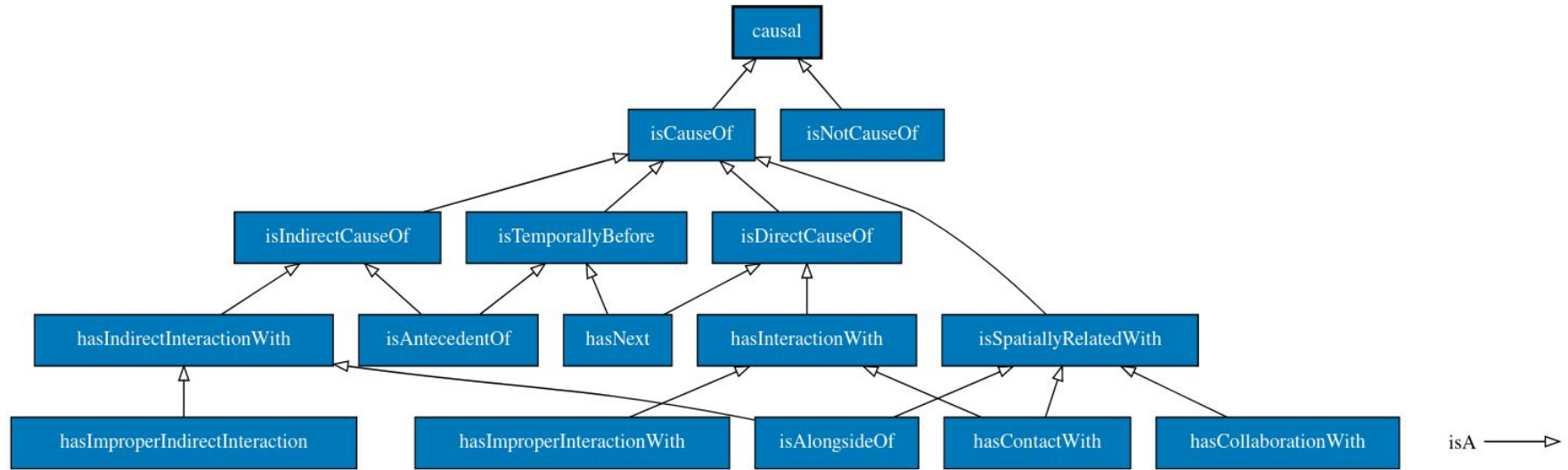
→ **direct integration into an (python) application possible**

object properties

mereologic properties (part-whole relations)



casual properties



semiotic properties

