

Units

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& others !

Units – some terminology

- **Basic symbols**
 - m, s, ...
- **Unit expression : combination of basic symbols**
 - m.s-1, m/s
- **Dimensional equation**
 - L+1T-1
- **Quantity**
 - ucd + value + unit

Units – various issues

- What are (how to write) the basic symbols?
 - Existing IAU/SI conventions: A, m, s, kg, ... OK
 - Astronomical symbols: Mo/solMass
 - Number of « things »: pixel/ct, photon/ph, count/ct
- How to combine symbols into a unit expression ?
 - Use of . , / , exponents , log() ?
- Unambiguous parsing of unit expression
 - CDS Unit library
 - ESA dimensional equations

Units – various issues

- Unit conversion

- pc into km
- Jy into $W.m^{-2}.Hz^{-1}$

- Quantity transformation

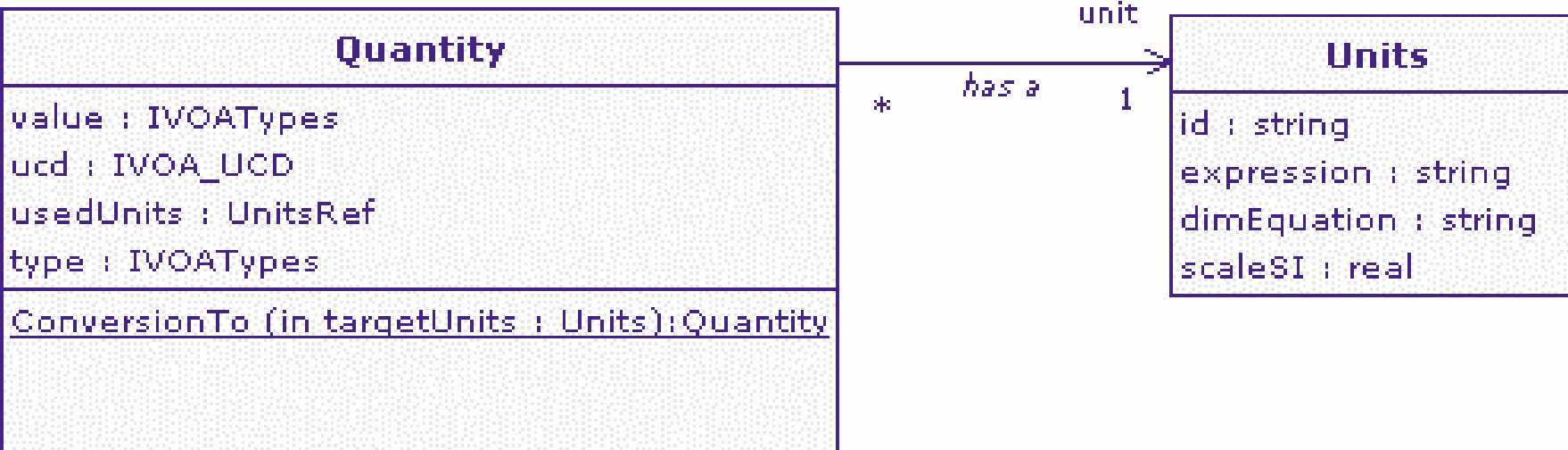
- Frequency into Wavelength
- Monochromatic flux (per wavelength) into Monochromatic flux (per frequency)
- Coordinate change (equatorial to galactic)

Dimensional analysis

- Don't confuse with formats

- decimal/sexagesimal $30.5deg = 30^{\circ}30'$

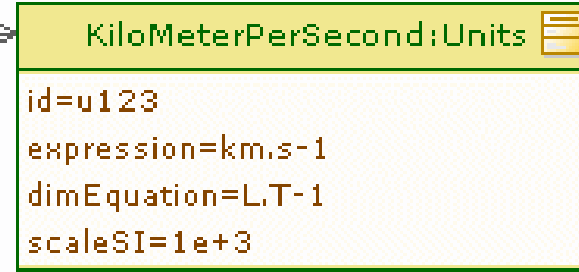
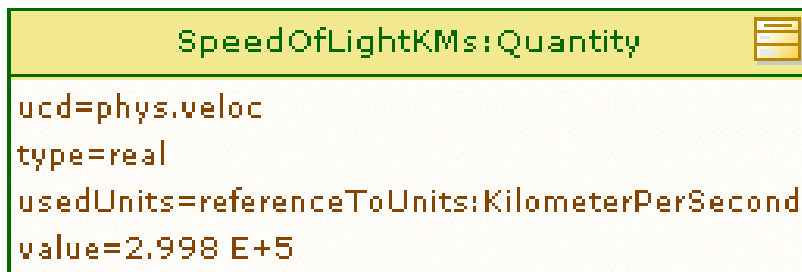
Modelling



<<dataType>> **T**
UnitsRef

<<dataType>> **T**
IVOATypes

<<dataType>> **T**
IVOA_UCD



description
Example of Qty
and Units
instances to
describe the
speed of light.

Units in the IVOA

- <http://www.ivoa.net/cgi-bin/twiki/bin/view/IVOA/UnitsDesc>
- Make recommendation for symbols, and rules to write **Unit expressions**
 - Rely on IAU rec., Vizier and HEASARC usage
 - BNF grammar to avoid ambiguities
 - Additional guidelines
- **Unit expression interpretation**
 - SI equivalent + factor
 - Dimensional equation

Units in the IVOA

- Issue with dimensionless quantities, and related « units »
 - dimensionless does not mean unitless !
- Angular measurement (coordinates, separation)
 - rad, deg, arcsec OK
- Bit, (photon) counts, pixels ?
- Often, the description of the quantity (UCD) is not present, and some « Unit » is used instead
 - *The Julian Day is 2402876.34*
 - value is 2402876.34, unit is « JD »
 - ... or is unit « day » and quantity is a Julian Day ?

Discussion