

Conceptual Relational Time Systems

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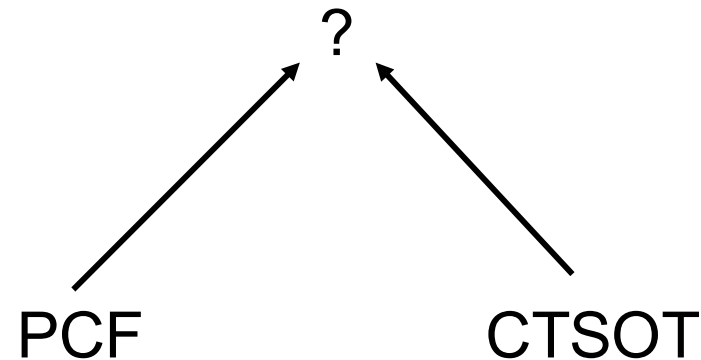
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Motivation

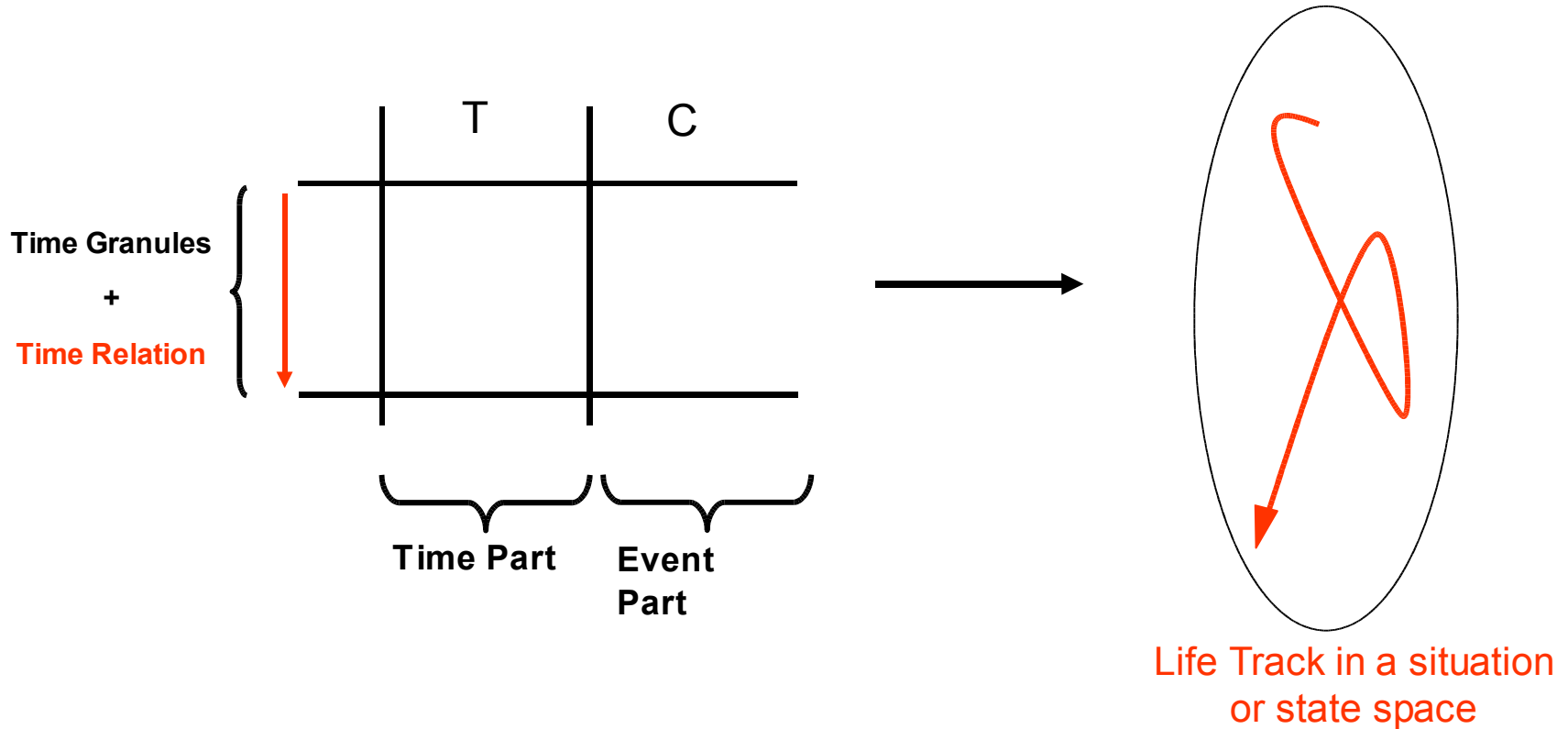
- FCA-based tool for
 - temporal and
 - relationalmodelling
- Generalization
 - of CTSOTs
 - of Power Context Families



Conceptual Time Systems

- Introduced by Wolff (prev. Presentation)
- Temporal Modelling with FCA Structures
- Advantages
 - Handle changing Granularities
 - Covers Continuous & Discrete Representation
 - Clear definition of state and situation

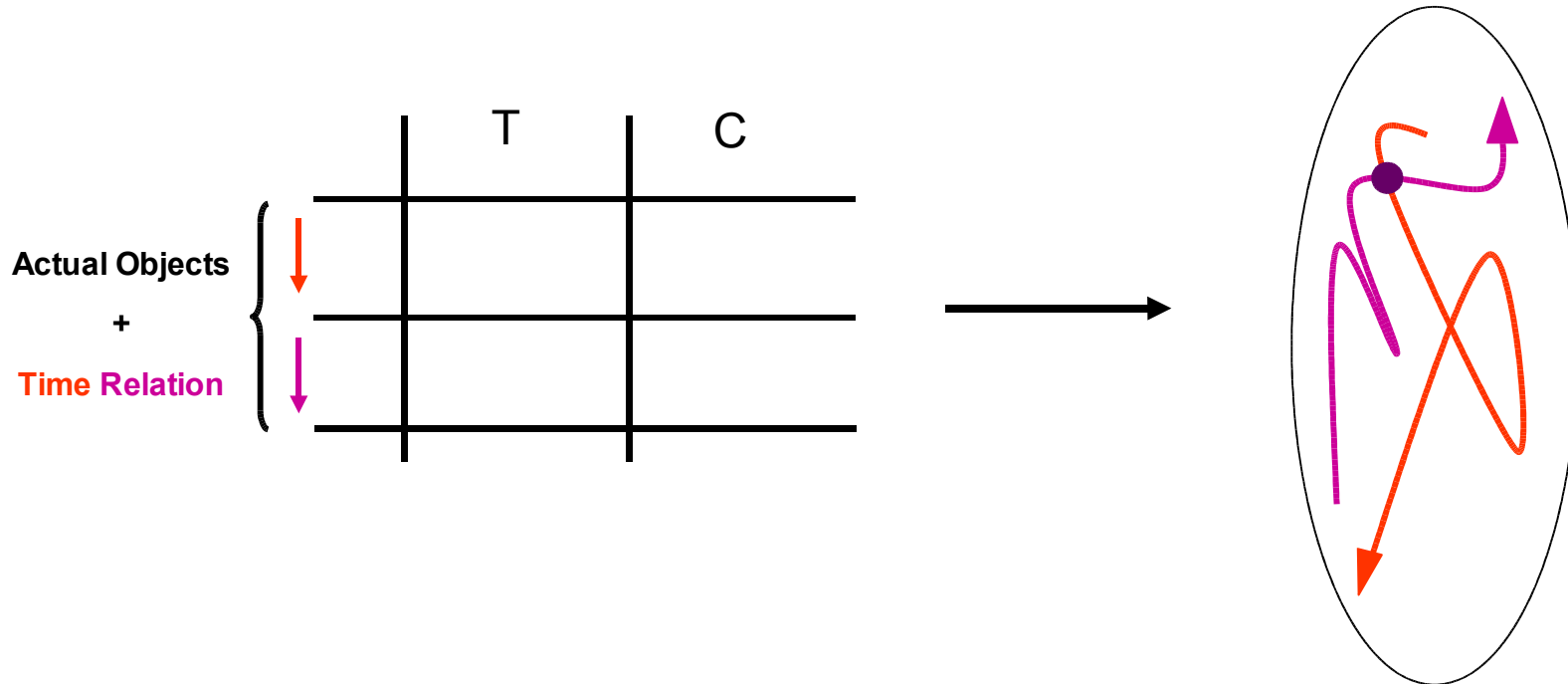
Conceptual Time Systems (2)



CTSOTs

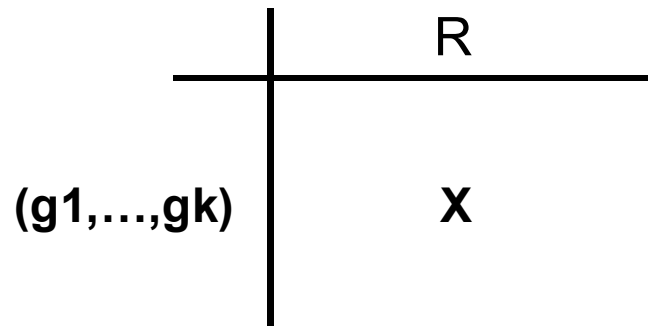
- Extension of CTSs
- Introduction of
 - Objects (persons)
 - Actual objects as objects with an eigentime
- Multiple life-tracks in one space
- “Meeting” situations observable

CTSOTs (2)



Power Context Families

- Sequence of formal contexts
 - With k-tuples as formal objects
 - With relation names as attributes



Conceptual Gestalt Systems

- Based on Phenomena and Gestalt
- Phenomenon:
“the object of a person’s perception”
- Gestalt:
“an organized whole that is perceived as more than the sum of its parts”

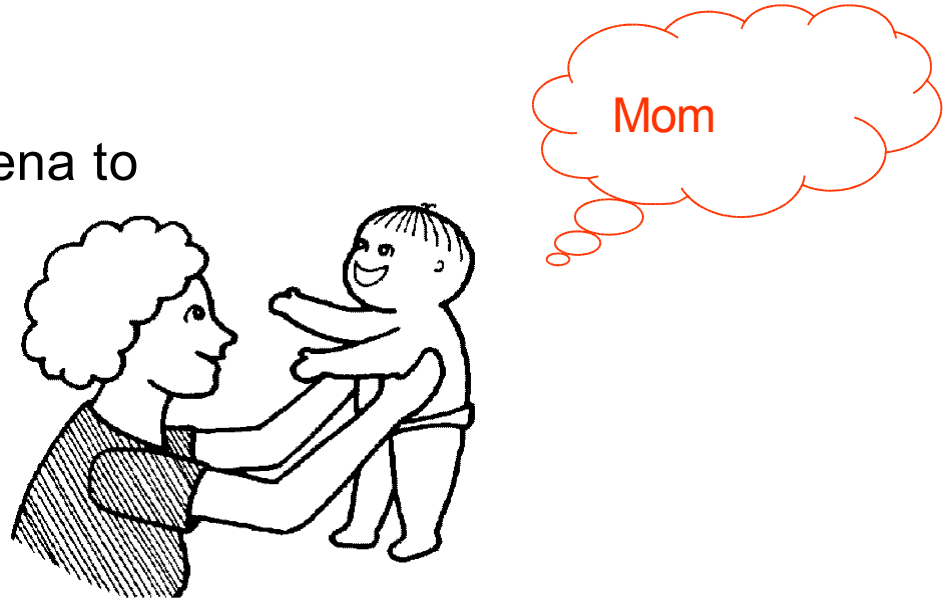
Source: **Oxford English Dictionary**

Conceptual Gestalt Systems

The mental Process of Gestalt Construction

- Perception (Phenomena)
- Identification of invariants
- Combination of similar phenomena to a mental object

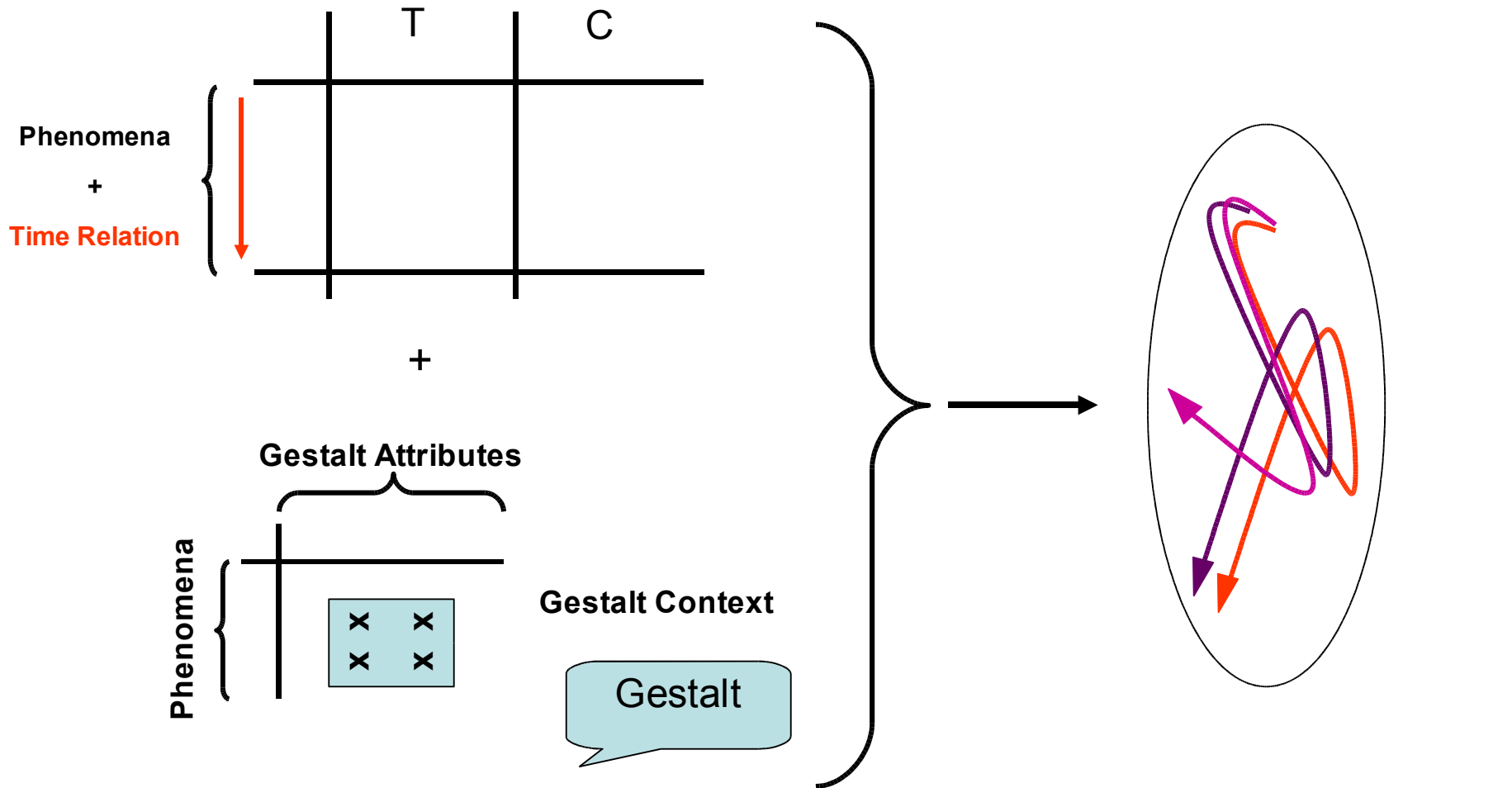
Conceptual Gestalt Systems formalize this process



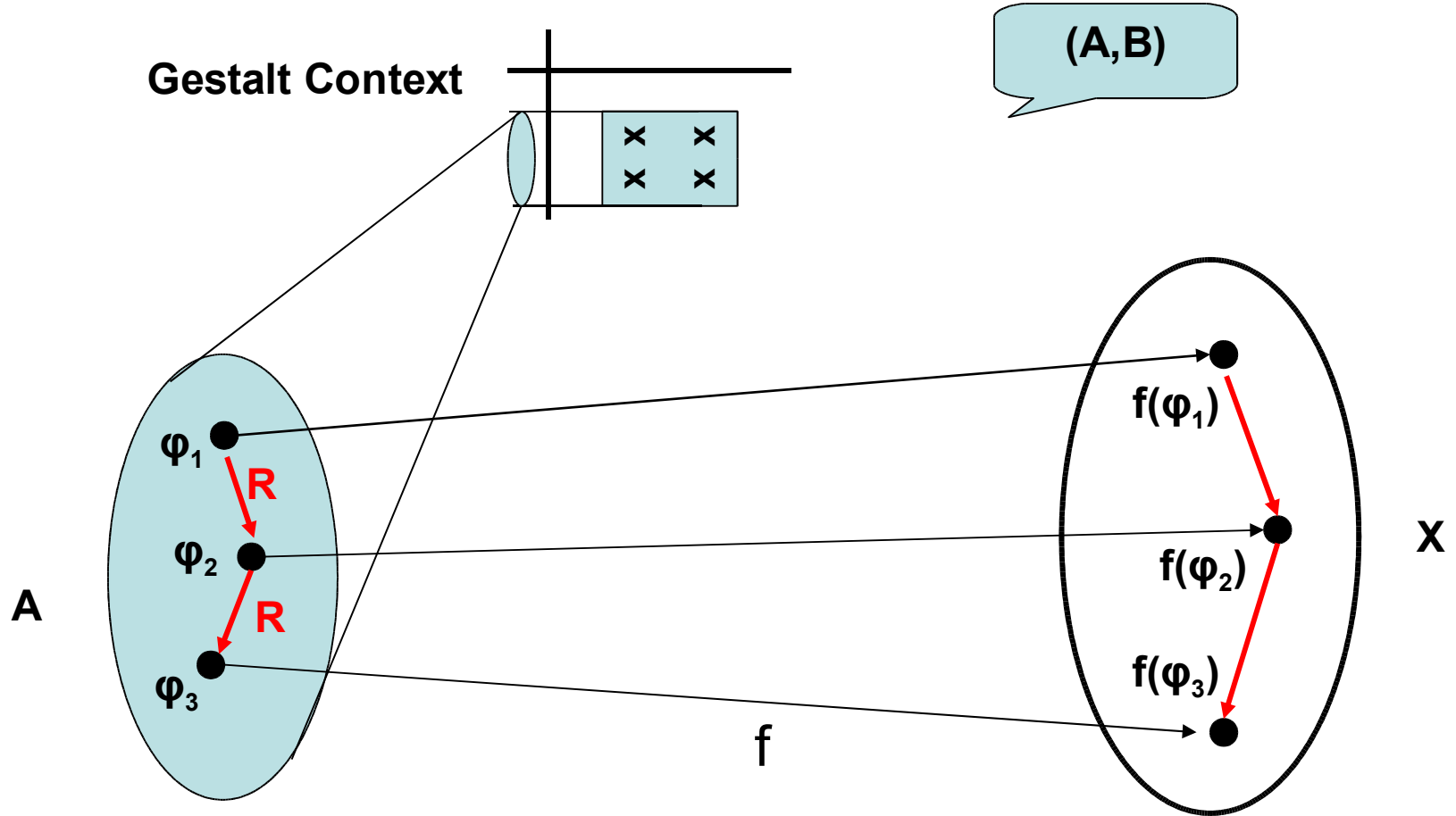
Conceptual Gestalt Systems (2)

- Set Φ of phenomena
- CTS over this set
- A Formal Context over Φ (Gestalt Context)
- Gestalt Context
 - Phenomena as formal objects
 - Gestalt Attributes as attributes
- Gestalt
 - Formal Concept in the Gestalt Context

Conceptual Gestalt Systems (3)



Life track of a Gestalt

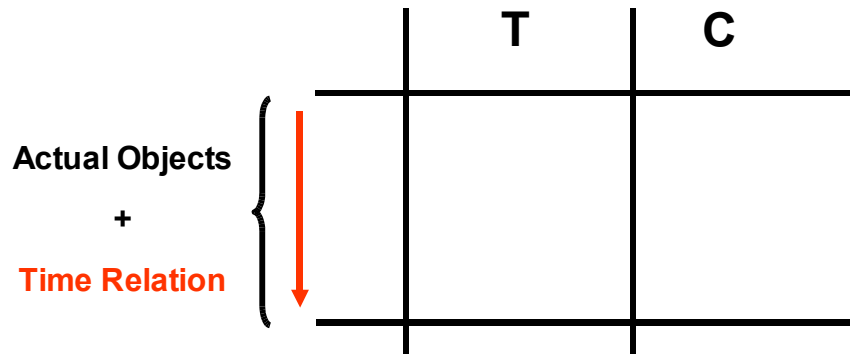


Special Choices of Phenomena and Gestalt Context

- Choosing
 - the phenomena as pairs of type (p,g)
 - the Gestalt Context as $(\Phi,\Phi,=)$yields a CTSOT.
- Choosing the phenomena such that
 - every phenomenon is a tuple of type $((x_1,\dots,x_n),g)$, where
 - x_1,\dots,x_n are also phenomena or some basic symbol
 - g is a time granuleyields what we call a
Conceptual Relational Time System (CRTS)

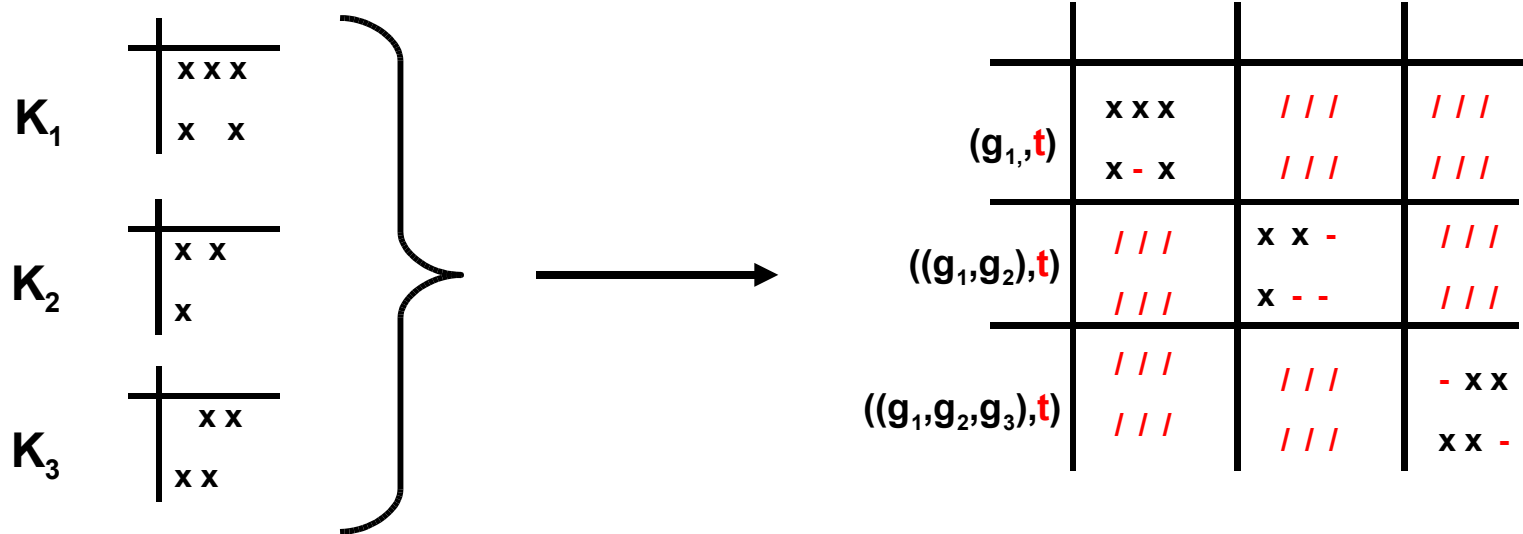
Special Choices of Phenomena and Gestalt Context (2)

- Each CTSOT is a special CGS
 - where the phenomena are the actual objects
 - where the Gestalten represent the persons



Special Choices of Phenomena and Gestalt Context (3)

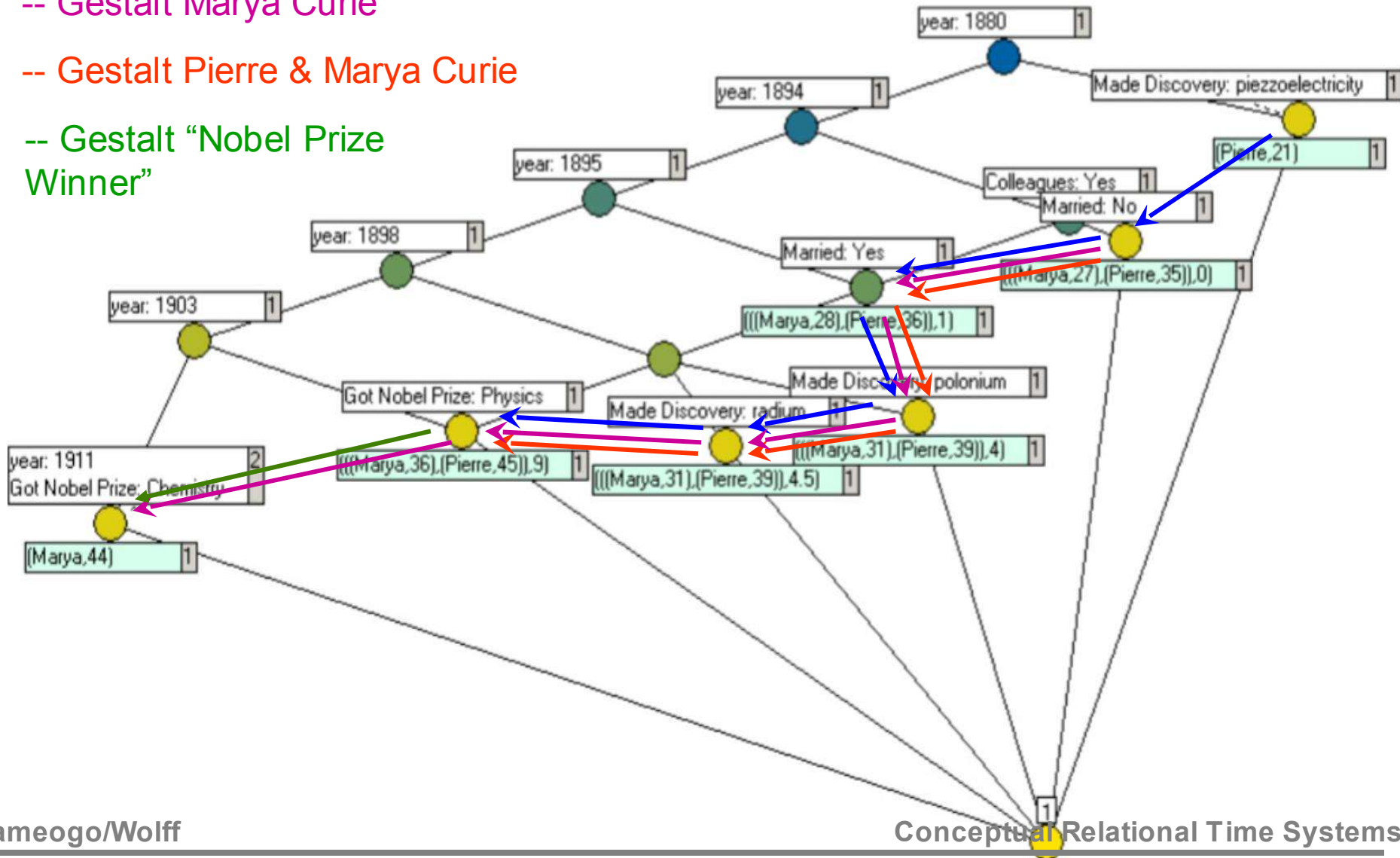
- Each PCF can be transformed into a CRTS
 - By adding some time granule to the k-tuples
 - And merging all contexts to one scaled many-valued context



CRTS Example: Pierre & Marya Curie

	Year	Nobel Prize	Discovery	MARRIED	COLLEAGUES
(Pierre,21)	1880		piezoelectricity		
((Marya,27),(Pierre,35)),0)	1894			No	Yes
((Marya,28),(Pierre,36)),1)	1895			Yes	Yes
((Marya,31),(Pierre,39)),4)	1898		polonium	Yes	Yes
((Marya,31),(Pierre,39)),4.5)	1898		radium	Yes	Yes
((Marya,36),(Pierre,45)),9)	1903	Physics		Yes	Yes
(Marya,44)	1911	Chemistry			

- Gestalt Pierre Curie
- Gestalt Marya Curie
- Gestalt Pierre & Marya Curie
- Gestalt "Nobel Prize Winner"



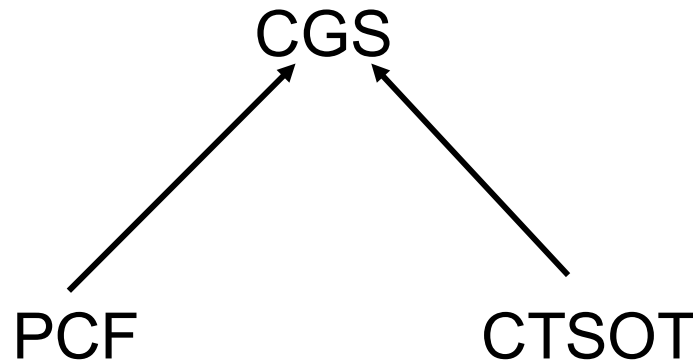
Yameogo/Wolff

Conceptual Relational Time Systems

Motivation – CTSs – CTSOTs – PCFs – CGSs – **Special CGSs** – Conclusion

Conclusion

- We have
 - Introduced CGSs
 - Shown how CGSs generalize CTSOTs
 - Introduced CRTSs as special CGSs for relational modelling
 - Shown how CRTSs generalize Power Context Families



The End

Thank You!

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