

# BFO 2020 At T Temporalized Axioms

Located in at some time [asd-1]

$$\forall p,q (\text{locatedInAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{locatedIn}(p,q,t)))$$

Concretizes at some time [gkc-1]

$$\forall p,q (\text{concretizesAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{concretizes}(p,q,t)))$$

Location of at some time [spm-1]

$$\forall p,q (\text{locationOfAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{locationOf}(p,q,t)))$$

Is carrier of at some time [qkm-1]

$$\forall p,q (\text{isCarrierOfAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{isCarrierOf}(p,q,t)))$$

Member part of at some time [kax-1]

$$\forall p,q (\text{memberPartOfAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{memberPartOf}(p,q,t)))$$

Has member part at some time [smy-1]

$$\forall p,q (\text{hasMemberPartAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{hasMemberPart}(p,q,t)))$$

Has participant at some time [ebs-1]

$$\forall p,q (\text{hasParticipantAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{hasParticipant}(p,q,t)))$$

Participates in at some time [oia-1]

$$\forall p,q (\text{participatesInAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{participatesIn}(p,q,t)))$$

Rdf:type is interpreted as meaning an instance is a given type whenever it exists, and that the instance exists at some point. [fyy-1]

$$\forall c,i (\text{rdfType}(c,i) \leftrightarrow (\forall t (\text{existsAt}(i,t) \rightarrow \text{instanceOf}(i,c,t))) \wedge \exists t \text{existsAt}(i,t))$$

Is concretized by at some time [zgc-1]

$$\forall p,q (\text{isConcretizedByAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{isConcretizedBy}(p,q,t)))$$

Material basis of at some time [exa-1]

$$\forall p,q (\text{materialBasisOfAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{materialBasisOf}(p,q,t)))$$

Continuant part of at some time [lzq-1]

$$\forall p,q (\text{continuantPartOfAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{continuantPartOf}(p,q,t)))$$

Has material basis at some time [fqc-1]

$$\forall p,q (\text{hasMaterialBasisAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{hasMaterialBasis}(p,q,t)))$$

Has continuant part at some time [jvz-1]

$$\forall p,q (\text{hasContinuantPartAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{hasContinuantPart}(p,q,t)))$$

Generically depends on at some time [vrq-1]

$$\forall p,q (\text{genericallyDependsOnAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{genericallyDependsOn}(p,q,t)))$$

Occupies spatial region at some time [yci-1]

$$\forall p,q (\text{occupiesSpatialRegionAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{occupiesSpatialRegion}(p,q,t)))$$

Spatially projects onto at some time [epa-1]

$$\forall p,q (\text{spatiallyProjectsOntoAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{spatiallyProjectsOnto}(p,q,t)))$$

Proper continuant part of at some time [sql-1]

$$\forall p,q (\text{properContinuantPartOfAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{properContinuantPartOf}(p,q,t)))$$

Has proper continuant part at some time [ule-1]

$$\forall p,q (\text{hasProperContinuantPartAtSomeTime}(p,q) \leftrightarrow \exists t (\text{existsAt}(p,t) \wedge \text{existsAt}(q,t) \wedge \text{hasProperContinuantPart}(p,q,t)))$$

Located in at all times [vdo-1]

$$\forall p,q (\text{locatedInAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{locatedIn}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{locatedIn}(p,q,t))))$$

Concretizes at all times [uge-1]

$$\forall p,q (\text{concretizesAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{concretizes}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{concretizes}(p,q,t))))$$

Location of at all times [imi-1]

$$\forall p,q (\text{locationOfAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{locationOf}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{locationOf}(p,q,t))))$$

Is carrier of at all times [fya-1]

$$\forall p,q (\text{isCarrierOfAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{isCarrierOf}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{isCarrierOf}(p,q,t))))$$

Member part of at all times [maf-1]

$$\forall p,q (\text{memberPartOfAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{memberPartOf}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{memberPartOf}(p,q,t))))$$

Has member part at all times [xwi-1]

$$\forall p,q (\text{hasMemberPartAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{hasMemberPart}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{hasMemberPart}(p,q,t))))$$

Has participant at all times [wyo-1]

$$\forall p,q (\text{hasParticipantAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{hasParticipant}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{hasParticipant}(p,q,t))))$$

Participates in at all times [ghl-1]

$$\forall p,q (\text{participatesInAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{participatesIn}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{participatesIn}(p,q,t))))$$

Is concretized by at all times [qhq-1]

$$\forall p,q (\text{isConcretizedByAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{isConcretizedBy}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{isConcretizedBy}(p,q,t))))$$

Material basis of at all times [scx-1]

$$\forall p,q (\text{materialBasisOfAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{materialBasisOf}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{materialBasisOf}(p,q,t))))$$

Continuant part of at all times [ztt-1]

$$\forall p,q (\text{continuantPartOfAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{continuantPartOf}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{continuantPartOf}(p,q,t))))$$

Has material basis at all times [qdl-1]

$$\forall p,q (\text{hasMaterialBasisAtAllTimes}(p,q) \leftrightarrow (\exists t (\text{hasMaterialBasis}(p,q,t) \wedge \text{existsAt}(p,t))) \wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{hasMaterialBasis}(p,q,t))))$$

Has continuant part at all times [uhy-1]

$\forall p,q (\text{hasContinuantPartAtAllTimes}(p,q)$   
 $\leftrightarrow (\exists t (\text{hasContinuantPart}(p,q,t) \wedge \text{existsAt}(p,t)))$   
 $\wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{hasContinuantPart}(p,q,t))))$

Generically depends on at all times [wie-1]

$\forall p,q (\text{genericallyDependsOnAtAllTimes}(p,q)$   
 $\leftrightarrow (\exists t (\text{genericallyDependsOn}(p,q,t) \wedge \text{existsAt}(p,t)))$   
 $\wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{genericallyDependsOn}(p,q,t))))$

Occupies spatial region at all times [tpr-1]

$\forall p,q (\text{occupiesSpatialRegionAtAllTimes}(p,q)$   
 $\leftrightarrow (\exists t (\text{occupiesSpatialRegion}(p,q,t) \wedge \text{existsAt}(p,t)))$   
 $\wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{occupiesSpatialRegion}(p,q,t))))$

Spatially projects onto at all times [ogh-1]

$\forall p,q (\text{spatiallyProjectsOntoAtAllTimes}(p,q)$   
 $\leftrightarrow (\exists t (\text{spatiallyProjectsOnto}(p,q,t) \wedge \text{existsAt}(p,t)))$   
 $\wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{spatiallyProjectsOnto}(p,q,t))))$

Proper continuant part of at all times [jiz-1]

$\forall p,q (\text{properContinuantPartOfAtAllTimes}(p,q)$   
 $\leftrightarrow (\exists t (\text{properContinuantPartOf}(p,q,t) \wedge \text{existsAt}(p,t)))$   
 $\wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{properContinuantPartOf}(p,q,t))))$

Has proper continuant part at all times [mxe-1]

$\forall p,q (\text{hasProperContinuantPartAtAllTimes}(p,q)$   
 $\leftrightarrow (\exists t (\text{hasProperContinuantPart}(p,q,t) \wedge \text{existsAt}(p,t)))$   
 $\wedge (\forall t (\text{existsAt}(p,t) \rightarrow \text{hasProperContinuantPart}(p,q,t))))$

