Microphysical supervenience, intrinsicness and DAUP

The *Doctrine of Arbitrary Undetached Parts* is the view that

> (DAUP) for every material object M, if R is the region of space occupied by M at time *t*, and if sub-R is *any* occupiable sub-region of R *whatever,* there exists a material object that occupies the region sub-R at *t*.

It has sometimes been held that the rejection of DAUP is incompatible with the following supervenience thesis:

> *Microphysical Supervenience* (MS). Necessarily, if atoms $A1,\ldots, A_n$ compose an object that exemplifies intrinsic qualitative properties Q_l through Q_n then atoms like $A_l,\ldots, A_n$ (in all their respective intrinsic qualitative properties), related to one another by all the same restricted atom-to-atom relations as $A1,\ldots, A_n$, compose an object that exemplifies $Q,\ldots, Q_n$.

In the first part of my paper, I will attempt to show that MS is false; in the second, I will argue that we can accept a weaker supervenience principle that does not entail DAUP.

My argument against MS trades upon considerations about the composition of material objects. Namely, MS entails that for any multitude of atoms, their plurally exemplified property 'compose an object like O with properties $Q_1,\ldots, Q_n$' is extrinsic to them, and thus cannot supervene on their microphysical properties. More precisely:

> (P1) If MS is true, then for any *x*s that compose an object with intrinsic qualitative properties $Q_1,\ldots, Q_n$, the *x*s' property 'compose an O-like object with properties $Q_1,\ldots, Q_n$' is an instance of MS
> (P2) MS is not true for extrinsic properties
> (P3) for any *x*s that compose an object O with intrinsic qualitative properties $Q_1,\ldots, Q_n$, the *x*s' property 'compose an O-like object with properties $Q_1,\ldots, Q_n$' is extrinsic to them. (*Composition is extrinsic*)
> (C) MS is false

(P1) is implied by the definition of MS. Throughout the discussion of the other two premises I try to be as neutral as possible with regard to the correct definition of intrinsicness, and stick to an intuitive duplication-based understanding of intrinsicness that is compatible with virtually all existing definitions. Bearing that in mind, (P2) is defended with a *reductio ad absurdum* argument: I will show that a contradiction can be derived from the assumption that a thing can have microphysically supervenient extrinsic properties. In defence of (P3), I will again rely on the idea of duplication and show that there is no relevant sense in which the duplication of atoms would preserve their compositional properties.

After concluding that MS is false, I will offer the following modified definition of microphysical supervenience:

> *Composition-neutral Microphysical Supervenience* (CMS): Necessarily, if atoms $A_1,\ldots, A_n$ compose an object that exemplifies intrinsic qualitative properties $Q_l,\ldots, Q_n$, then any object composed by atoms like $A_l,\ldots, A_n$ (in all their respective intrinsic qualitative properties), related to one another by all the same restricted atom-to-atom relations as $A_1\ldots, A_n$, exemplifies $Q_1,\ldots Q_n$.

I will argue that CMS is superior to MS. It does not fall prey to the argument from composition, yet it is compatible with a very strong physicalistic picture of the world. In sum, CMS satisfies all the crucial desiderata: it allows for the rejection of DAUP, but it is strong enough to serve as a plausible definition of microphysical supervenience.