

IPM-Isfahan workshop on  
**Various Aspects of Modality**

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## **Turning Yablo's Paradoxes into Modality Theorems**

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### **Abstract**

Paradoxes are amazing puzzles in philosophy (and mathematics), and they can be interesting when turned into proofs and theorems (in mathematics and logic). For example, Russell's paradox, which collapsed Frege's foundations of mathematics, is now a classical theorem in set theory, and implies that no set of all sets can exist. Or, as another example, the Liar paradox has turned into Tarski's theorem on the undefinability of truth in sufficiently rich languages. This paradox also appears implicitly in Gödel's proof of the first incompleteness theorem. For Gödel's incompleteness theorem, some other paradoxes such as Berry's or Yablo's have been used to give alternative proofs.

In this talk, I will focus on Yablo's paradox, which is the first one of its kind that supposedly avoids self-reference and circularity, and will show how it can turn into some theorems in the First-Order Logic, the Linear Temporal Logic, and the Second-Order Logic. This is the first time that this paradox is transformed into some genuine mathematico-logical theorem(s) even though it had been used for proving some old results. In fact, we believe that, the temporal logic version of this paradox reveals its true nature.