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Large entropy $\mathbb{Z}^d$ shifts with highly restrictive subsystems and factors

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(joint work with Mike Boyle and Ronnie Pavlov)

Using recent techniques by Hochman and Meyerovitch we construct families of positive entropy $\mathbb{Z}^d$ shifts of finite type (SFTs) and $\mathbb{Z}^d$ sofic shifts satisfying the following constraints: For $d \geq 2$ there are topologically mixing $\mathbb{Z}^d$ sofic shifts S of arbitrarily large entropy that contain a unique minimal subsystem which is also the only subSFT in S. S does not have any non-trivial SFT factor, any non-trivial block gluing subshift factor or any factor with measurably completely positive entropy, but S allows for a factor having topologically completely positive entropy. Similar results hold for $\mathbb{Z}^d$ SFTs X (with $d \geq 2$) of arbitrarily large entropy: X contains a zero-entropy subSFT that intersects all non-empty subsystems of X and thus X can not factor onto any non-trivial block gluing shift (in particular there are no non-trivial full shift factors). Again X has a (sofic) factor of topologically completely positive entropy and can be made topologically mixing.

Contrary to this strengthening a previous result of Desai we are able to show that every block gluing $\mathbb{Z}^d$ shift factors onto any lower entropy full shift.