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**Inadequacy of von Neumann entropy for characterising extractable work** OSCAR DAHLSTEN, Singapore Centre for Quantum Technology, National University of Singapore, and Clarendon Laboratory, University of Oxford, RENATO RENNER, ETH Zurich, ELISABETH RIEPER, Singapore Centre for Quantum Technology, National University of Singapore, VLATKO VEDRAL, Singapore Centre for Quantum Technology, National University of Singapore, and Clarendon Laboratory, University of Oxford — The lack of knowledge an observer has about a system limits the amount of work it can extract. This lack of knowledge is normally quantified using the Shannon/von Neumann entropy. We show that this standard approach is, surprisingly, only correct in very specific circumstances. In general one should use the recently developed smooth entropy approach. For many common physical situations, including large but internally correlated systems, the resulting values for the extractable work can deviate arbitrarily from those suggested by the standard approach. (For details see arXiv:0908.0424)

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