1135-13-659 **Alessandro De Stefani**, **Eloísa Grifo** and **Jack Jeffries*** (jackjeff@umich.edu). *The Zariski-Nagata theorem in all characteristics.*

One version of a classical result by Zariski and Nagata describes symbolic powers in polynomial rings over the complex numbers in terms of differential operators. Namely, the n-th symbolic power of a prime consists of the elements such that each differential operator of order at most n-1 sends the element into the prime ideal. This was extended to polynomial rings over perfect fields by Dao, De Stefani, Grifo, Huneke, and Núñez-Betancourt. However, this description fails in mixed characteristic. In this paper, we use p-derivations, a notion due to Buium and Joyal, to define a new kind of differential powers in mixed characteristic, and prove that this new object does coincide with the symbolic powers of prime ideals. This seems to be the first application of p-derivations to Commutative Algebra.

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