Building examples using power series over Noetherian rings

Joint work with William Heinzer and Christel Rotthaus

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In ongoing work with William Heinzer and Christel Rotthaus over the past twenty years we have been applying a construction technique for obtaining sometimes baffling, sometimes badly behaved, sometimes Noetherian, sometimes non-Noetherian integral domains. This technique of intersecting fields with power series rings goes back to Akizuki-Schmidt in the 1930s and Nagata in the 1950s, and since then has also been employed by Nishimuri, Heitmann, Ogoma, the authors and others.

We are writing a book about our procedures and examples. We present some of the theory and techniques we use, and mention some examples. In particular we may mention some famous classical examples and show how they are streamlined with this technique or give an example that is "almost Noetherian" in that exactly one prime ideal is not finitely generated.