Succinct Data Structures for Parameterized Pattern Matching

The last two decades have witnessed the design of succinct data structures for the pattern matching problem and for its numerous extensions that use suffix tree as the underlying main ingredient.
At the heart of these developments, lie two breakthrough results - *FM Index* [FOCS, 2000] and *Compressed Suffix Array* (CSA) [STOC, 2000], which encapsulate the pattern matching functionality of the suffix tree in (near) optimal number of bits.
These succinct representations are facilitated by a crucial component of suffix tree called suffix links, which have a certain rank-preserving property.
However, in many important variants (for e.g., parameterized suffix tree and two-dimensional suffix tree), suffix links do not follow this rank-preserving property. Consequently, designing succinct indexes for these variants has proved difficult.
We achieve a positive breakthrough on one such variant, namely *Parameterized Pattern Matching* [STOC, 1993], which has eluded researchers for over 15 years.
In this talk, we shall first focus briefly on traditional succinct index (specifically, the FM Index), then discuss some of the difficulties of parameterized matching (and why traditional succinct indexes fail), and finally discuss our approach to a succinct index for the problem.