A Pellian equation with primes and its applications

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This is joint work with Andrej Dujella and Mirela Jukić Bokun. Let p be an odd prime and k non-negative integer. We consider a Pellian equation of the form

$$x^2 - (p^{2k+2} + 1)y^2 = -p^{2l+1}, \quad l \in \{0, 1, \ldots, k\},$$

and prove that it has no solutions in positive integers x and y. By using this result and other known results on the topic of Diophantine m-tuples, we obtain results on extensibility of $D(-1)$-pairs of the form $\{1, 2b\}$, where $2b = p^{2j} + 1$, $j > 0$, and p is an odd prime, to $D(-1)$-quadruples in the ring $\mathbb{Z}[\sqrt{-t}], t > 0$.