Code-based cryptography: A way to secure communications

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Tania Richmond, Pierre-Louis Cayrel, Viktor Fischer. Code-based cryptography: A way to secure communications. womENcourage 2015, Sep 2015, Uppsala, Sweden. hal-02018870

HAL Id: hal-02018870
https://inria.hal.science/hal-02018870v1

Submitted on 14 Feb 2019

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Code-based cryptography: A way to secure communications

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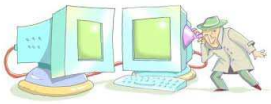
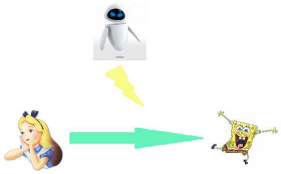


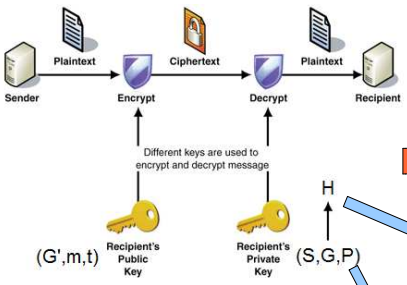
Context: Make secure communications.

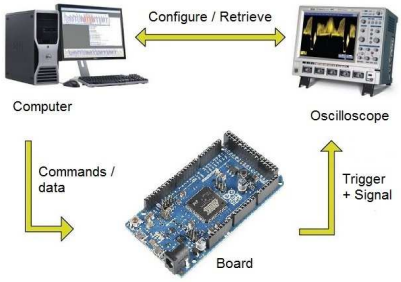


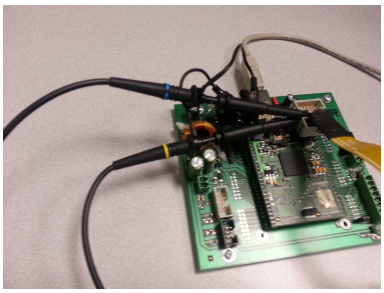
Objectives: Find an alternative to currently used methods in cryptography in order to avoid side-channel attacks.

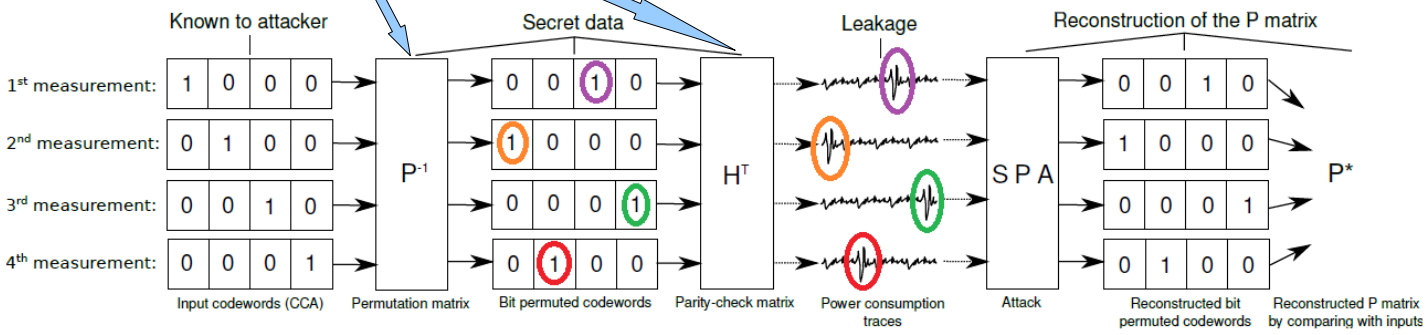
How? Implementing existing protocols and testing side-channel attacks. Then find mathematical methods to make them more secure.

Experiments:









Solution: Maintain all multiplications (also by zero) in order to avoid differences between processing zeros and ones.

Conclusion: We improved security of cryptographic protocols making them more resilient against side-channel attacks.

Perspectives: Provide a complete and secure implementation.

Publications:

M. Petrvalsky, T. Richmond, M. Drutarovsky, P.-L. Cayrel and V. Fischer. *Countermeasure against the SPA Attack on an Embedded McEliece Cryptosystem.* Accepted in MAREW 2015.

V. Dragoi, P.-L. Cayrel, B. Colombier and T. Richmond. *Polynomial structures in code-based cryptography.* In Progress in Cryptology - INDOCRYPT 2013, pp. 286-296, Springer International Publishing.