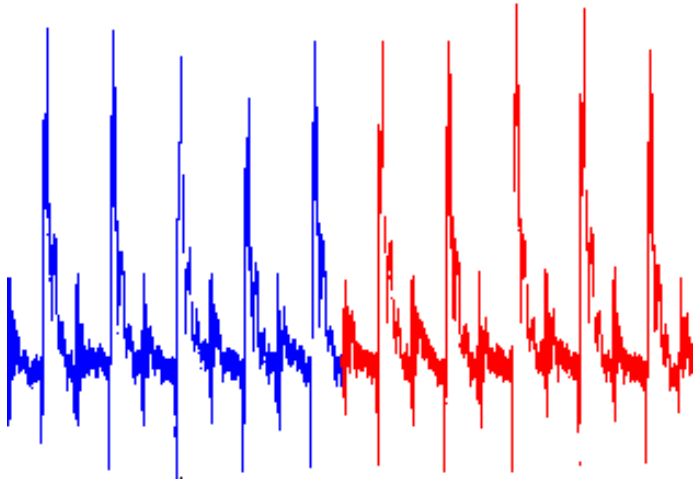
Towards Leakage Simulators that Withstand the Correlation Distinguisher



P. Pessl, ***F.-X. Standaert***, S. Mangard, F. Durvaux

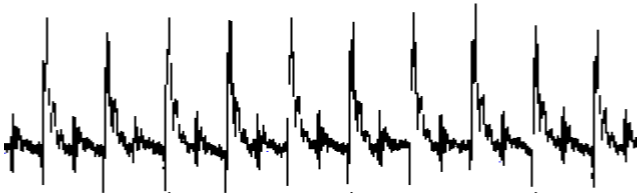
IAIK TU Graz (Austria), UCL Crypto Group (Belgium)

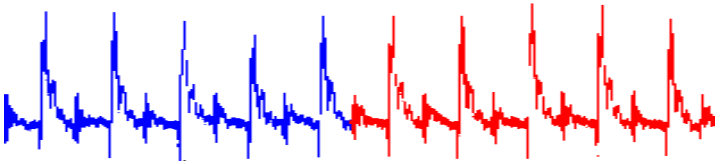
ASIACRYPT rump session, December 2014

Background

- Split & Concatenate Simulator (CRYPTO 2013)

$$\mathrm{L}(x, k, y) \approx \mathrm{L}(x, \tilde{k}, y^*) \| \mathrm{L}(x^*, \tilde{k}, y)$$





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Can we do better?

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- In particular for *large parallel implementations* (since we know 8-bit AES implementations can be broken in one trace anyway – see SASCA paper)

Repeating experiments with a 65nm ASIC

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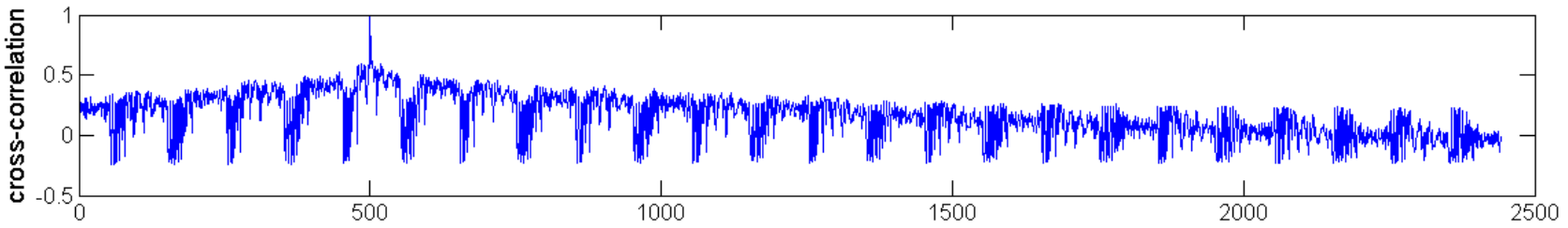

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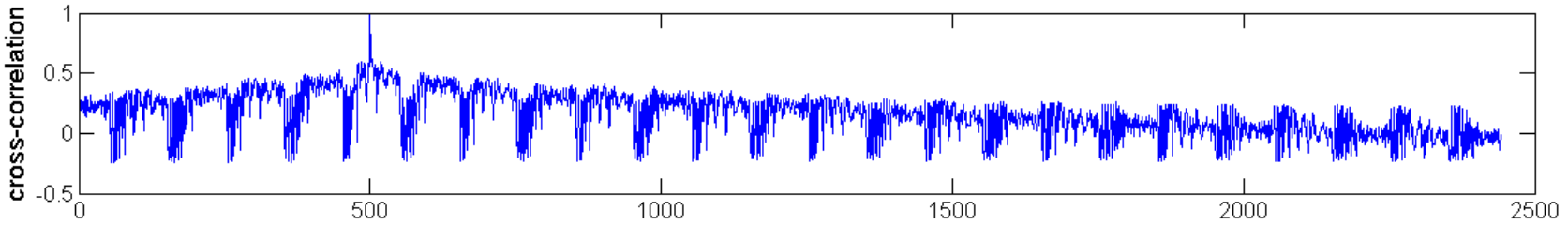

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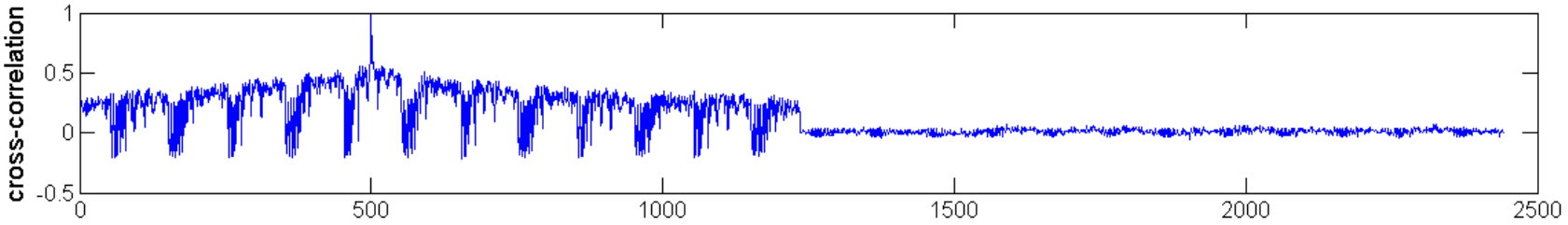

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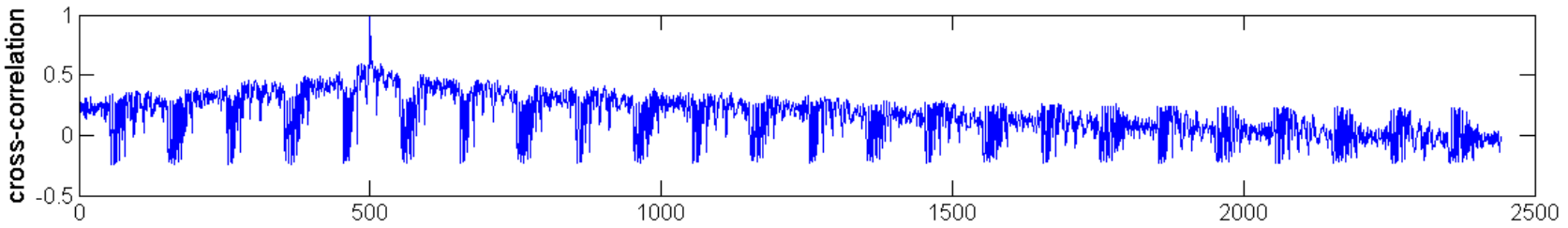

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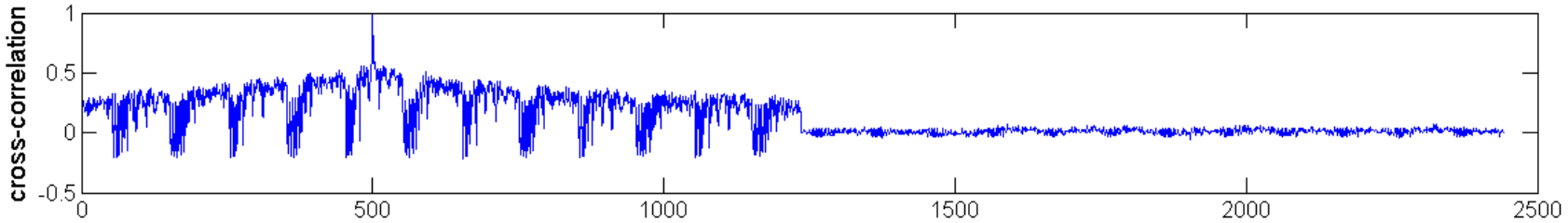
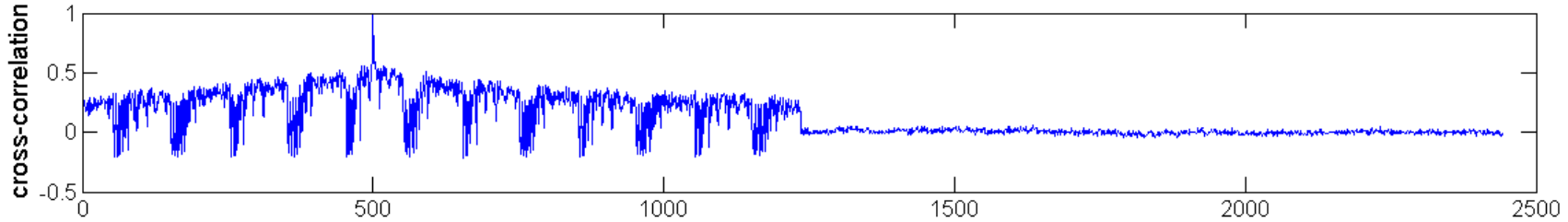


- & fake simulated traces $\delta(x, k, y) + N_1||\delta(x, k, y) + N_2$



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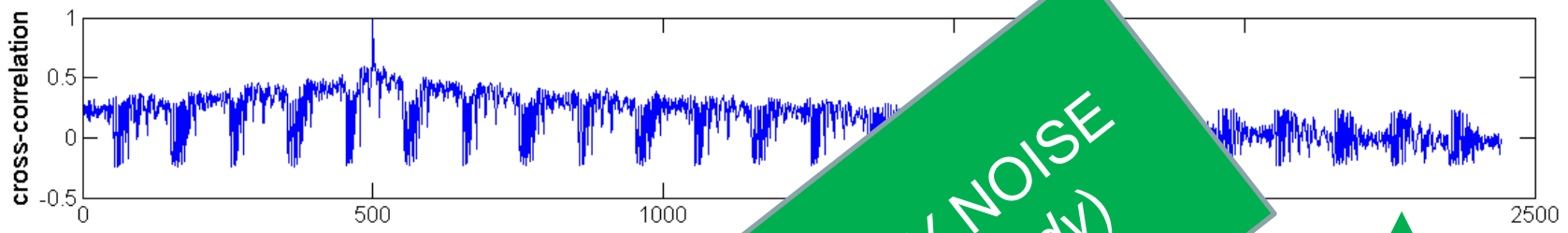

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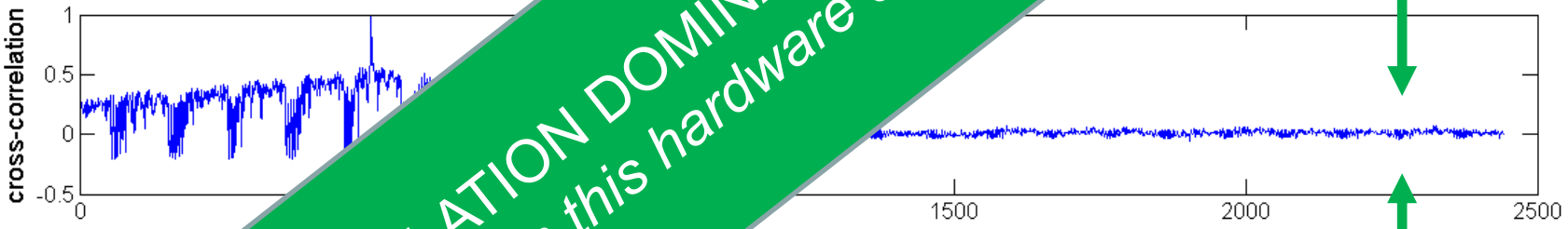

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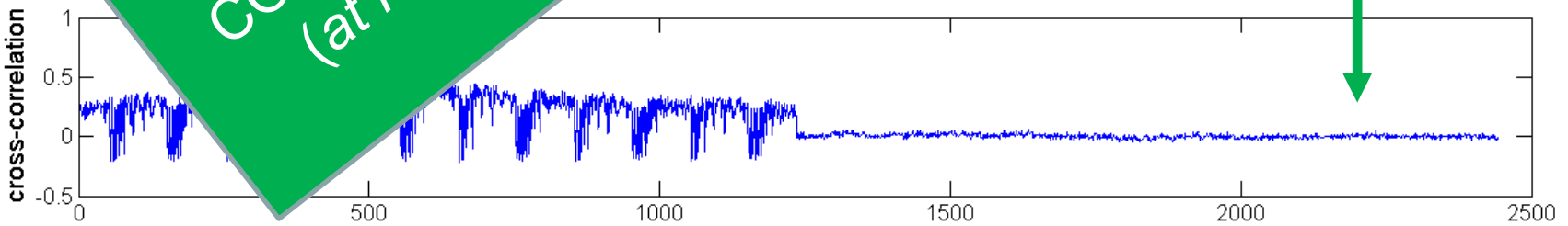

CORRELATION DOMINATED BY NOISE
(at least in this hardware case study)

A first improvement

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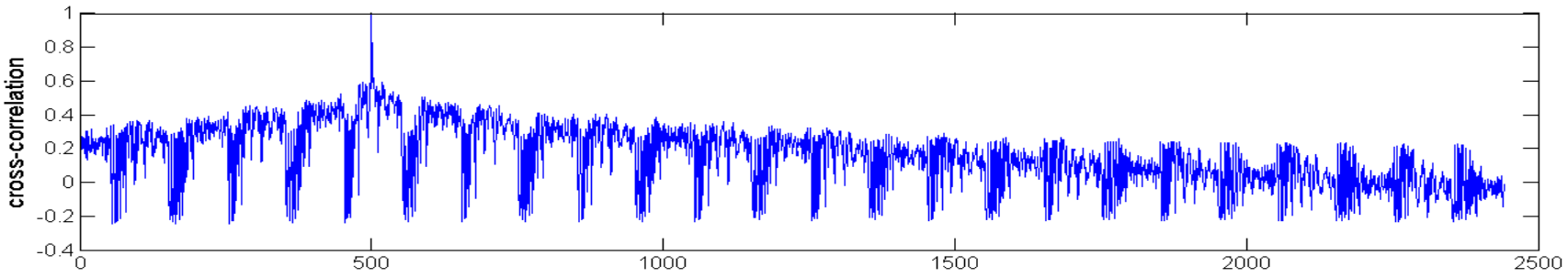

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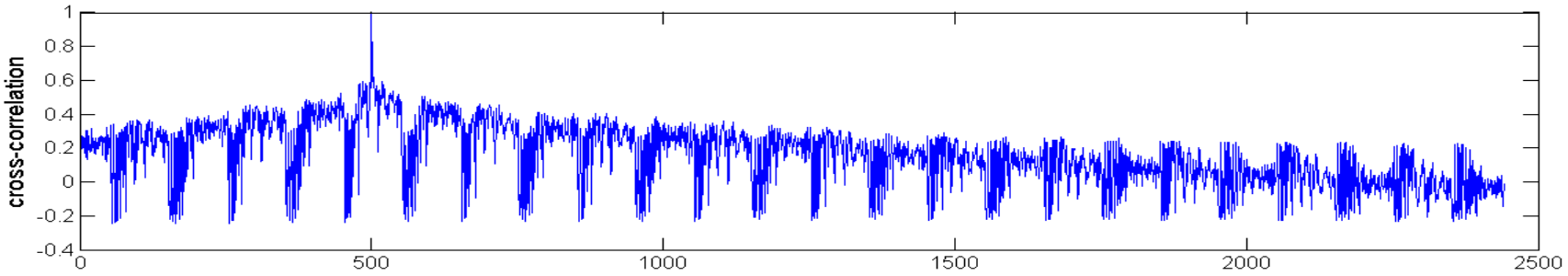

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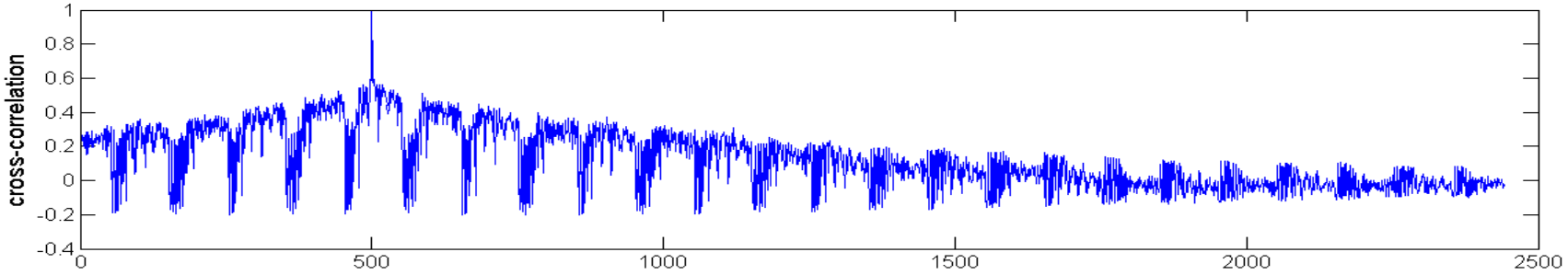

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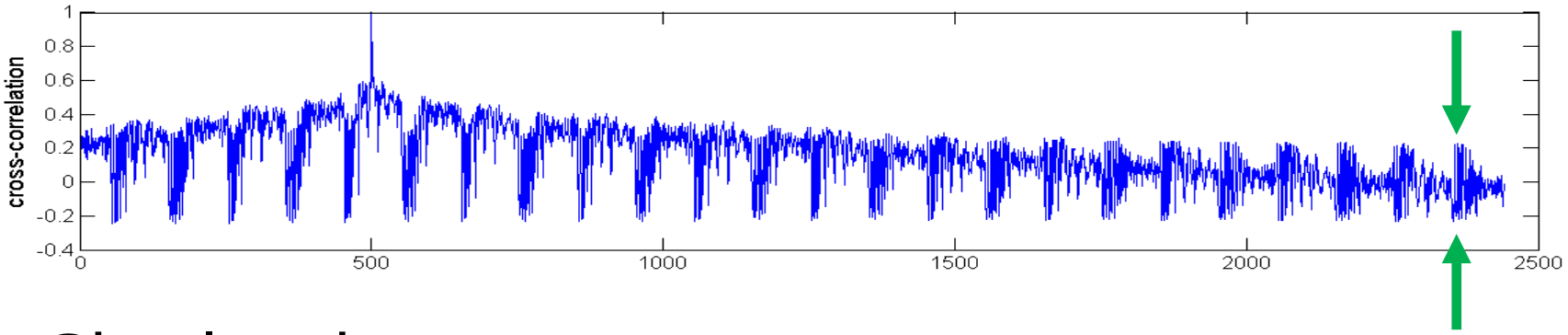

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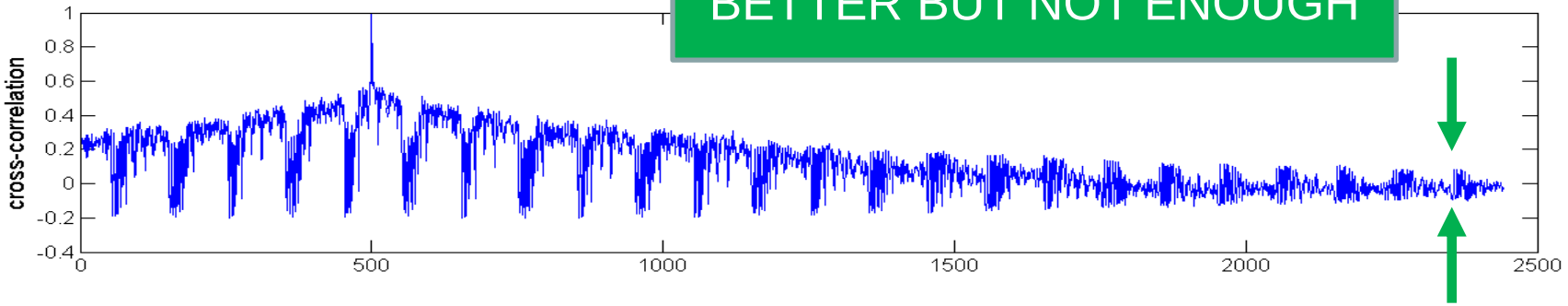
BETTER BUT NOT ENOUGH



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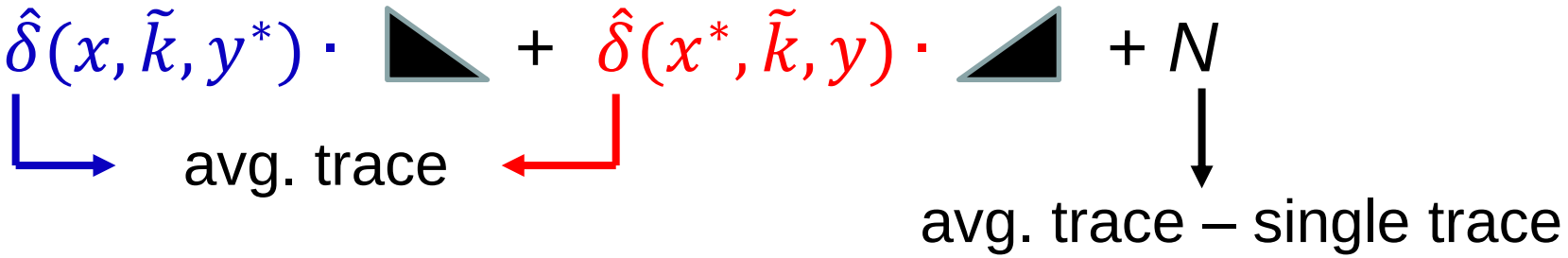

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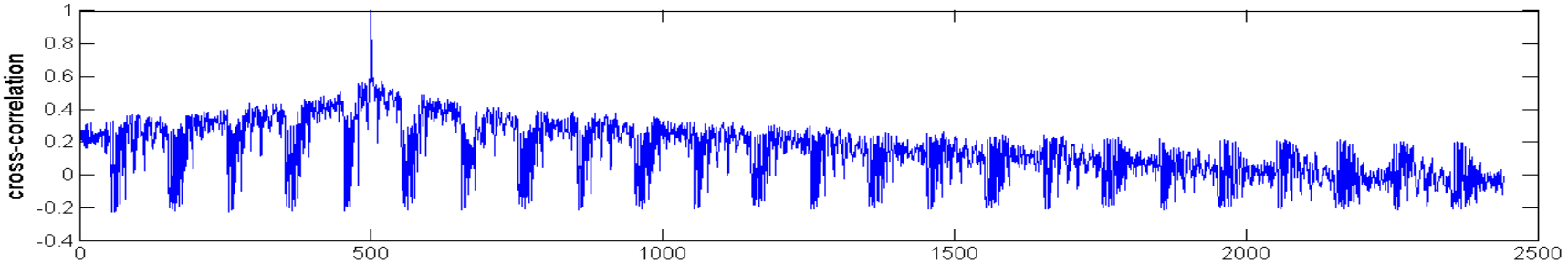

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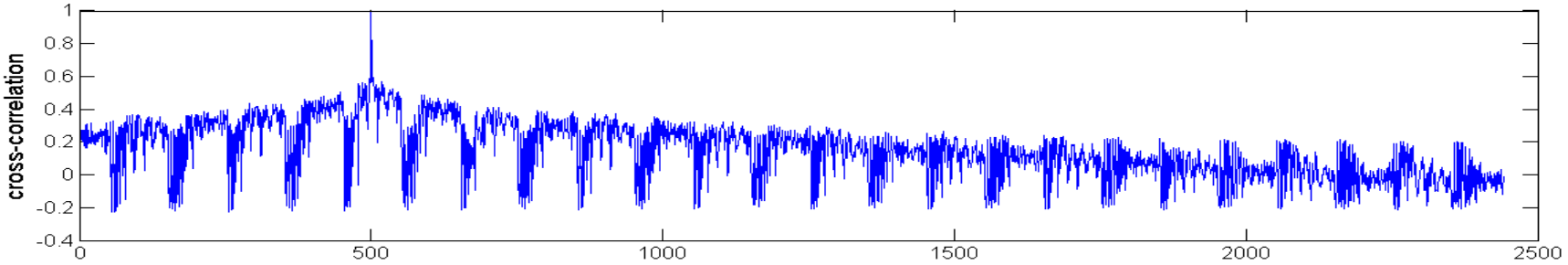

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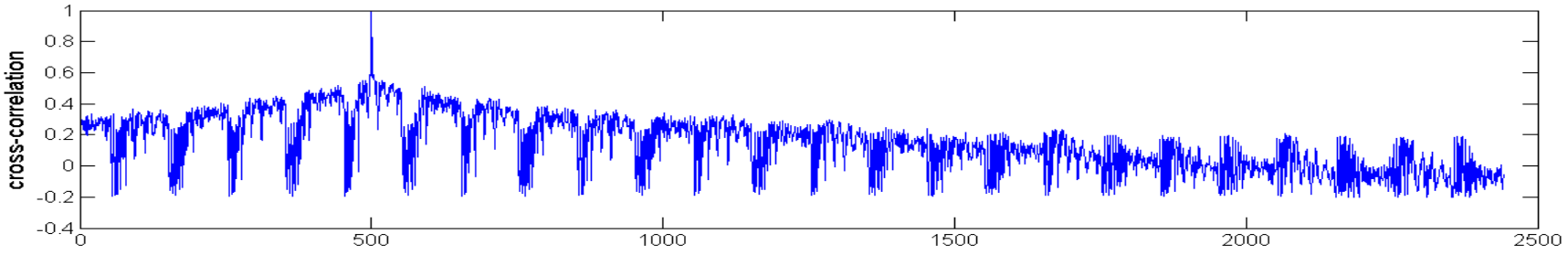

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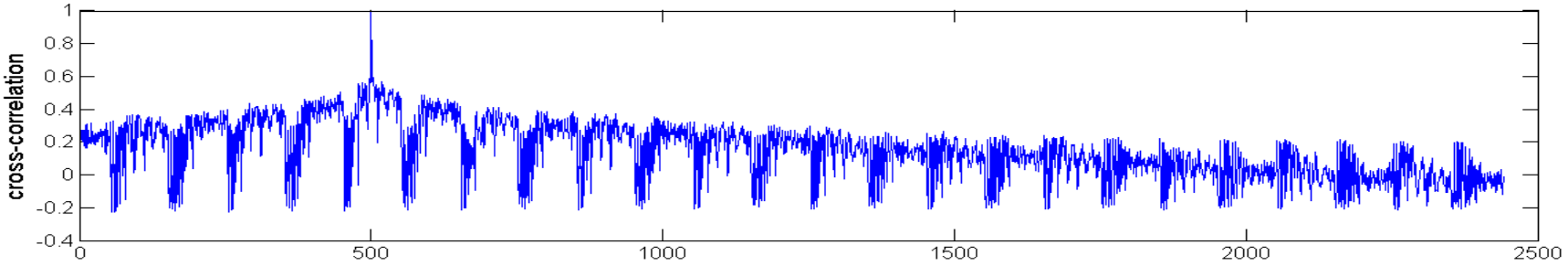

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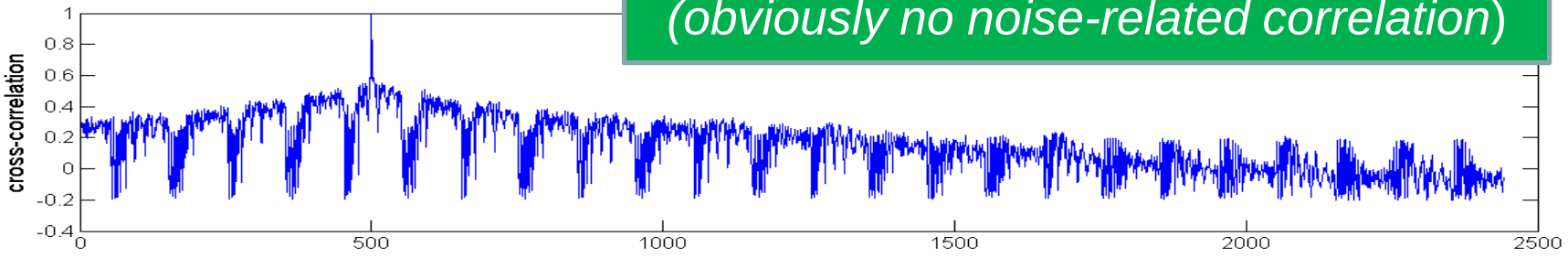
LOOKS GOOD
(obviously no noise-related correlation)



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Reminder: simulatability is the only empirically verifiable leakage assumption we currently have!

STAY TUNED

http://perso.uclouvain.be/fstandae/