Patent Owner Caltech's Oral Argument
May 8, 2018

Apple, Inc. v. California Institute of Technology.

Case No. IPR2017-00700

Instituted Grounds: Pat. No. 7,421,032

IPR2017-00700

Ground	Claims	Basis	Prior Art
1	11, 12, 14-16	103	Ping, MacKay, Divsalar
2	13	103	Ping, MacKay, Divsalar, Luby97

IPR2017-00701

Ground	Claims	Basis	Prior Art
1	1, 4-10	103	Ping, MacKay, Divsalar, Luby97

IPR2017-00728

Ground	Claims	Basis	Prior Art
1	18-23	103	Ping, MacKay, Divsalar, Luby97

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Caltech's Groundbreaking Invention

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IRA codes solved a decades-old problem

▸ Gallager introduced LDPC codes in 1963, but they required complex quadratic encoding that prevented their adoption for decades. (MM ¶¶181-182, 194.)

> range of trade-offs between performance and decoding complexity. One major criticism concerning LDPC codes has been their apparent high *encoding* complexity. Whereas turbo codes can be encoded in linear time, a straightforward encoder implementation for a LDPC code has complexity quadratic in the block length. Several authors have addressed this issue:

Richardson 2001 (EX2011) at 2 (emphasis added)

> While semiconductor technology has progressed to an extent where the implementation of LDPC codes has become possible, many practical issues still remain.
>
> First and foremost, there is a need to reduce complexity without sacrificing performance.

Kim 2006 (EX2010) at 1 (emphasis added)

▸ 4

IRA codes solved a decades-old problem

> 186.   Despite the fact that LDPC codes had been known in the art since the 1960s, prior to the invention of IRA codes no one in the art had devised a way to achieve near-Shannon limit communications with low complexity encoding and decoding. Use of LDPC codes had been particularly hindered by encoding complexity that discouraged their use in practical applications.

> 187.   The invention of IRA codes provided a solution to the long-standing shortcomings of LDPC codes and error correcting codes in general. IRA codes allow near-Shannon limit communications with low complexity encoding and decoding. As a result, the IRA codes, encoders, decoders, and methods disclosed and claimed in the '032 patent have been widely praised by the industry.

MM ¶¶ 186, 187

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