**CSMA/CN: Carrier Sense Multiple Access with Collision Notification**

**Summary**
This paper is introducing a method to reliably and promptly detect collisions on wireless networks. The proposed solution presents hardware which would utilize two antennas at the transmitter thus enabling the transmitter to listen while transmitting. With some work to cancel out the self-signal and use of correlation to keep track of preambles and unique signatures, it is possible to allow collision notifications to be broadcast which can abort a transmission. Through simulation, the paper shows that substantial improvements to throughput can be achieved with the use of collision notification.

**Salient Points/Outline**
- **The Concept:**
  - Transmitter can listen while ending (two antennas)
    - Currently transmitter doesn't listen while transmitting
  - Receiver is the one issuing notifications
- **Two antennas for the transmitter**
  - Need to deal with self-signal
  - Notification comes in the same channel as the transmission
    - Detection done with signal correlation
- **Destination's signature added after data frame preamble**
  - Signature needs to be unique, O(n)
  - Receiver searches for preamble when receiving a frame
  - Receiver will search for its own signature while it's receiving a frame
- **Collision notifications is simply the receiver's signature**
- **Packet resumption done by approximating what the receiver should have successfully received**
- **Still dependent on ACKs**
- **Correlation used instead of decoding**
  - Decoding needs to be accurate
  - Decoding is more expensive and requires more overhead
- **Self-signal depression**
  - Self-signal sent over a wire after making it through transmit interface
- **Antenna configuration can reduce self-signal and help improve correlation**
- **Throughput higher with CN due to fewer wasted transmissions**

**Limitations**
- **Packet resumption seems overly optimistic**
  - How does the receiver know from which point the transmitter is wishing to resume?
- **Collision notifications can potentially cause collisions, though unlikely**
  - Recovery procedures can be used to recover packets
**Broader Perspective/Open issues:**

- How do you detect collisions in some cases if receiver only listening for its own signature?
- How are signatures assigned?
- Is the pre or post amplified signal sent over the wire for self-suppression?
- 2ft between receiving and transmitting antenna seems like a lot
- Is CSMA/CN scalable for large networks?
- How is the receiver sending and receiving at the same time?