**Fe paper structure**

Introduction

* Motivation
  + Magnetism and dynamics central role in metallic systems with stron e-e correlations
    - Numerous examples (high TC, QCP, oxides and functional materials, transport
  + X’’(Q,w) at the heart of time-dependent response
  + Reliable prediction leads to understanding in complex systems
* Iron
  + fruit-fly material
    - Classic itinerant electron magnet
    - Correlated electron system
    - Calculations: a benchmark for calculation of spin dynamics
    - Experiment: development of instrumentation
      * Reactors and TAS
      * Pulsed sources and mapping of S(Q,w)
* Background
  + About iron
  + Localisation .v. itinerancy;
    - local moment formation
    - Heisenberg picture
    - Stoner picture
  + Spin waves measurements
    - Collins (possibly earliest spin wave measurements I think, 1955)
    - Mook & Nicklow 🡺 damping 🡺 Stoner
    - Mook, Paul at ILL
    - Pulsed sources: early stuff (Loong; Perring)
  + Spin wave calculations
    - Cooke and Blackman
  + We present state-of-the art experiment and calculation…

Measurements

* TOF technique
* What we did
* Horace
* Resolution convolution and Tobyfit

Results

* Overview
* Low energies
  + Stiffness
  + Intensities
  + Damping
  + Comparison with Mook et al
* High energies
  + Overview of features
  + Comparison with Paul and Mook

TD-DFT

* Theory
  + Buczek
  + Questaal
  + Cao

Discussion

* Energy scale at long wavelength limit
  + We agree with old data
* Intermediate energies (up to 150 meV say)
  + Marked discrepancy with old data
  + Comparison with calculation
* High energy
  + Energy scale
  + Different behavior of [100] direction, P point
  + Additional scattering
* Meaning

TGP 16 Sep 2020