Analysis Data files

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October 2020

1 Introduction

The purpose of this document is to explain the files that are input to the analysis code.

2 File types

Each folder is named with the data the sub-run was started "YYYYMMDD". Each file is named "YYYMMDD_Attempt_SpectrumNum
Attempt tells you which start attempt it was. Sometimes, starting the sub-run didn't as planned so we would have to kill is and start over. Only the files with the highest Attempt number should be used. Spectrum number tells you what iteration you are on within the attempt. These all correspond to each other. In each folder there are ? types of files each described below:

- **par**: This is a spreadsheet that contains information for all of the spectra extracted while data was being take. Some of these values go into the analysis directly.
- **tx**: This is a cavity transmission measurement taken on the ENA before we begin taking the power spectrum. **tx2** is the same but taken an hour later, after the power spectrum is taken. I_tx^2 + Q_tx^2 will look like a lorentzian.
- **rfl**: This is a cavity reflection measurement taken on the ENA before we begin taking the power spectrum. **rfl2** is the same but taken an hour later, after the power spectrum is taken. I_rfl^2 + Q_rfl^2 will look like an inverse lorentzian.
- **jpaamp**: This is a measurement of the gain profile of the amplifier taken in cavity reflection on the ENA before we begin taking the power spectrum. **jpaamp2** is the same but taken an hour later, after the power spectrum is taken. I_jpaamp^2 + Q_jpaamp^2 will look like a lorentzian with an inverse lorenzian in the middle (that is the cavity).
- **psa** This is the power spectrum! "meanavgps" within this contains all useful info. "meanavgps.singlesided_powerspecavg" is the power spectrum itself that goes into the analysis. It is made up of an average of an hours worth of smaller power spectra. "meanavgps.singlesided_ptweightspec" is the same but each sub-sub-spectrum were weighted by the probe tone power before being averaged. The tone powers are also saved in this file as "meanavgps.pt_power_est_list"
- **yfactor** This is all of the info for the hot-cold load measurement that gives you N_H. "cold_gain" is the single quadrature amplifier gain of the amplifier measured before taking the cold spectrum. "hot_gain" is the single quadrature amplifier gain of the amplifier measured before taking the hot spectrum. I_hot, Q_hot and I_cold, Q_cold are JPA profile measurements like in the "jpaamp" file. "noise_amp_on_cold" is the cold spectrum and "noise_amp_on_hot" is the hot spectrum. Like above, this also saves the probe tone monitored versions but these don't go into the analysis
- This is all of the information for the abg measurement that gives us G_S and S_C. Dan named this the $\alpha\beta\gamma$ measurement so if you see that around, its the same thing. I am just too lazy to type out greek letters. This contains 3 measurement:
  - a: SQ off, off of cavity resonance. "quad_amp_a" is the power spectrum. I_a and Q_a are the jpaamp-like measurements. G_a is the single quad gain.
  - b: SQ off, on cavity resonance. "quad_amp_b" is the power spectrum. I_b and Q_b are the jpaamp-like measurements. G_b is the single quad gain.
  - g: SQ on, on cavity resonance. "quad_amp_g" is the power spectrum. I_g and Q_g are the jpaamp-like measurements. G_g is the single quad gain.