

# Plots\_RadiusCentre

September 23, 2015

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In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline

In [2]: alldat = pd.read_pickle("RadiusCentre.p")

In [3]: mags = alldat["mag"].unique()

grouped_initial = alldat.groupby(['Soffset', 'Doffset'])

groups_init = {}
for a,b in grouped_initial:
    group = b[['R', 'x', 'y', 'z', 'relerrR', 'mag', 'Soffset', 'Doffset']]
    groups_init[a] = {'means':group.groupby("mag").mean(),
                     'vars':group.groupby("mag").var(ddof=1),
                     'stds':group.groupby("mag").std(ddof=1)}

In [4]: S0D0 = groups_init[(0,0)]['means'].relerrR.as_matrix()
S1D0 = groups_init[(1,0)]['means'].relerrR.as_matrix()
S0D1 = groups_init[(0,1)]['means'].relerrR.as_matrix()
S1D1 = groups_init[(1,1)]['means'].relerrR.as_matrix()

fig,ax = plt.subplots(ncols=1,nrows=1,figsize = (10,7))
ax.plot(mags,S0D0,'*-',label="S0D0")
ax.plot(mags,S1D0,'*-',label="S1D0")
ax.plot(mags,S0D1,'*-',label="S0D1")
ax.plot(mags,S1D1,'*-',label="S1D1")

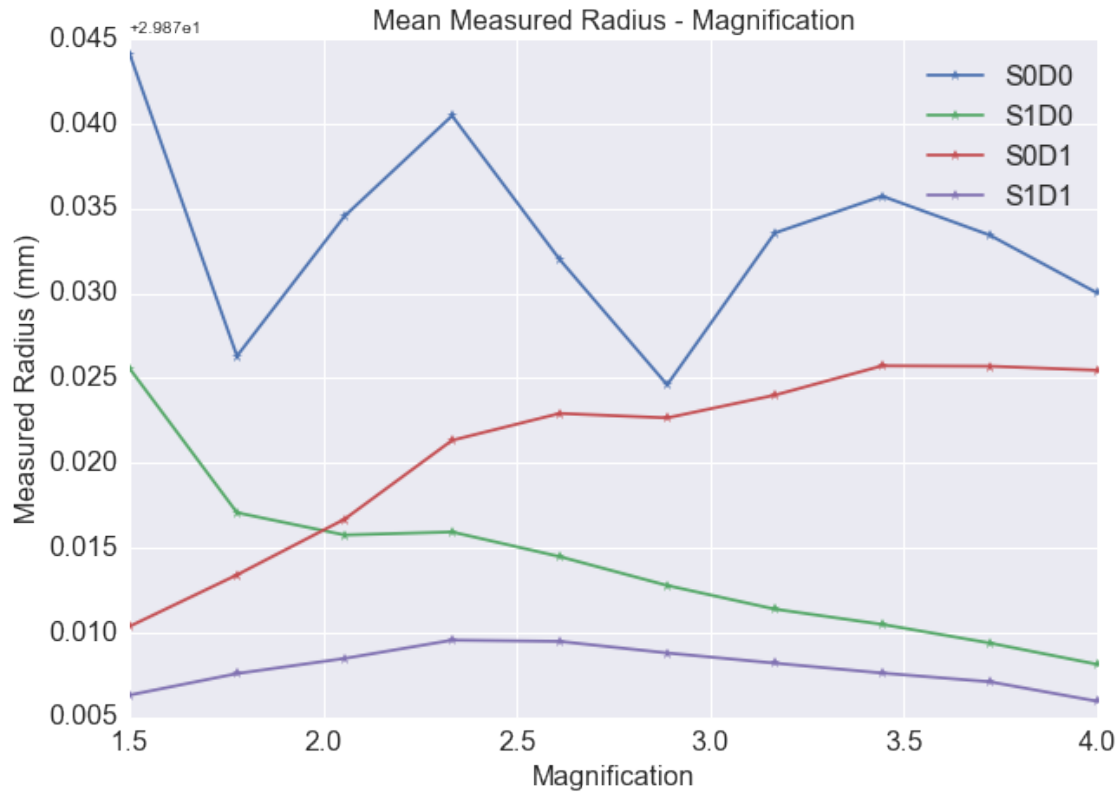
ax.legend(loc=0,fontsize=16)
ax.set_title("Relative error in Radius - Magnification",fontsize = 16)
ax.set_ylabel("Relative Error (%)",fontsize = 16)
ax.tick_params(axis='both', which='major', labels=16)
ax.set_xlabel("Magnification",fontsize = 16);
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In [5]: S0D0 = groups_init[(0,0)]['means'].R.as_matrix()
        S1D0 = groups_init[(1,0)]['means'].R.as_matrix()
        S0D1 = groups_init[(0,1)]['means'].R.as_matrix()
        S1D1 = groups_init[(1,1)]['means'].R.as_matrix()

fig,ax = plt.subplots(ncols=1,nrows=1,figsize = (10,7))
ax.plot(mags,S0D0,'*-',label="S0D0")
ax.plot(mags,S1D0,'*-',label="S1D0")
ax.plot(mags,S0D1,'*-',label="S0D1")
ax.plot(mags,S1D1,'*-',label="S1D1")

ax.legend(loc=0,fontsize=16)
ax.set_title("Mean Measured Radius - Magnification",fontsize = 16)
ax.set_ylabel("Measured Radius (mm)",fontsize = 16)
ax.tick_params(axis='both', which='major', labelsize=16)
ax.set_xlabel("Magnification",fontsize = 16);
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In [6]: S1D0 = groups_init[(1,0)]['stds'].R.as_matrix()
        S0D1 = groups_init[(0,1)]['stds'].R.as_matrix()
        S1D1 = groups_init[(1,1)]['stds'].R.as_matrix()

fig,ax = plt.subplots(ncols=1,nrows=1,figsize = (10,7))
ax.plot(mags,S1D0,'*-',label="S1D0")
ax.plot(mags,S0D1,'*-',label="S0D1")
ax.plot(mags,S1D1,'*-',label="S1D1")

ax.legend(loc=0,fontsize=16)
ax.set_title("Standard Deviation of Measured Radius - Magnification",fontsize = 16)
ax.tick_params(axis='both', which='major', labelsize=16)
ax.set_ylabel("Standard Deviation (mm)",fontsize = 16)
ax.set_xlabel("Magnification",fontsize = 16);
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In [7]: S0D0x = groups_init[(0,0)]['means'].x.as_matrix()
        S1D0x = groups_init[(1,0)]['means'].x.as_matrix()
        S0D1x = groups_init[(0,1)]['means'].x.as_matrix()
        S1D1x = groups_init[(1,1)]['means'].x.as_matrix()

        S0D0y = groups_init[(0,0)]['means'].y.as_matrix()
        S1D0y = groups_init[(1,0)]['means'].y.as_matrix()
        S0D1y = groups_init[(0,1)]['means'].y.as_matrix()
        S1D1y = groups_init[(1,1)]['means'].y.as_matrix()

        S0D0z = groups_init[(0,0)]['means'].z.as_matrix()
        S1D0z = groups_init[(1,0)]['means'].z.as_matrix()
        S0D1z = groups_init[(0,1)]['means'].z.as_matrix()
        S1D1z = groups_init[(1,1)]['means'].z.as_matrix()

fig,(ax1,ax2,ax3) = plt.subplots(ncols=1,nrows=3,figsize = (10,14),sharex=True)

ax1.set_title("Position of centre - Magnification",fontsize = 16)

ax1.plot(mags,S0D0x,'*-',label="S0D0")
ax1.plot(mags,S1D0x,'*-',label="S1D0")
ax1.plot(mags,S0D1x,'*-',label="S0D1")
ax1.plot(mags,S1D1x,'*-',label="S1D1")

ax1.legend(loc=0,fontsize = 16)
ax1.tick_params(axis='both', which='major', labels=16)
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ax1.set_ylabel("X-Coordinate (mm)",fontsize = 16)

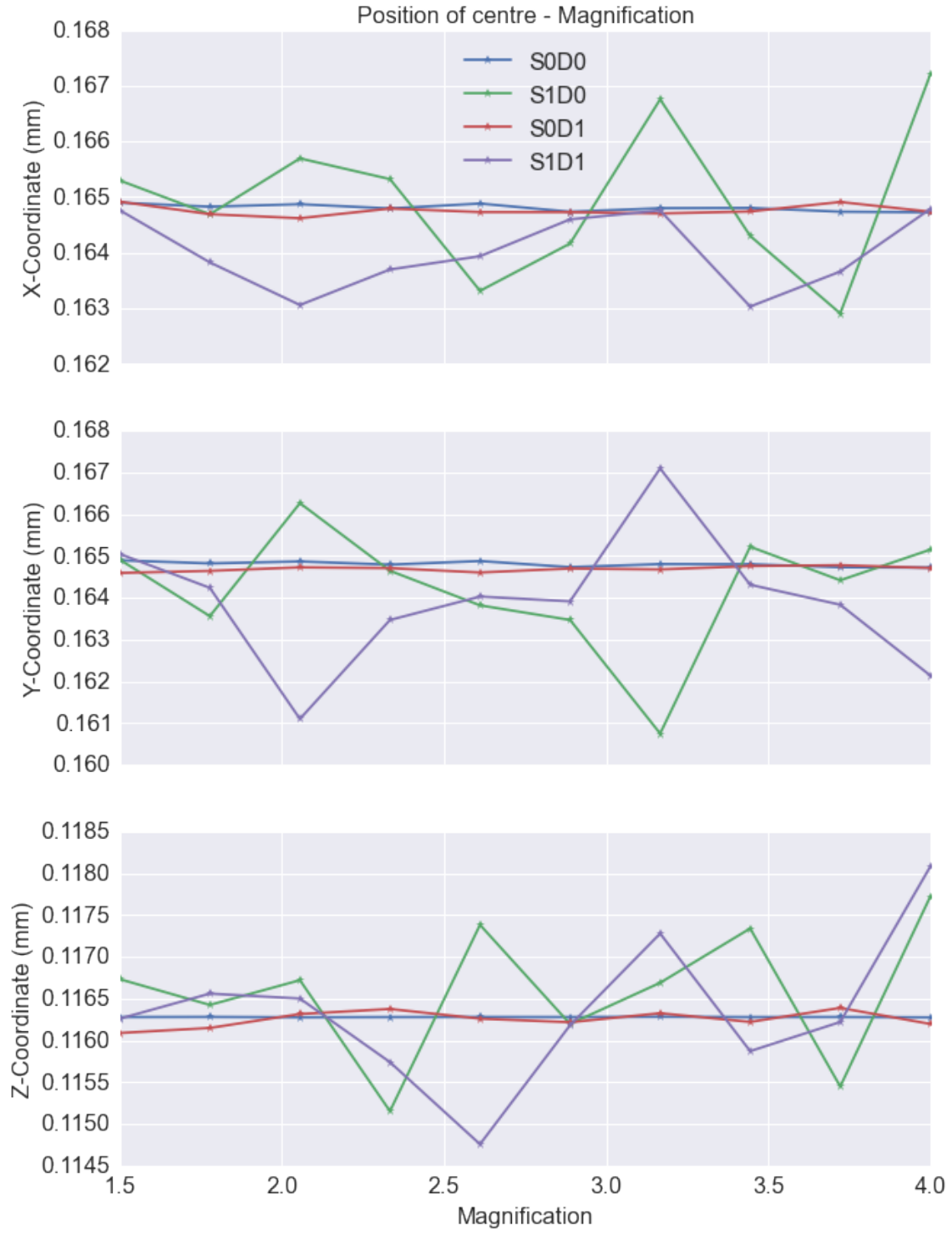
ax2.plot(mags,S0D0y,'*-',label="S0D0")
ax2.plot(mags,S1D0y,'*-',label="S1D0")
ax2.plot(mags,S0D1y,'*-',label="S0D1")
ax2.plot(mags,S1D1y,'*-',label="S1D1")

ax2.tick_params(axis='both', which='major', labels=16)
ax2.set_ylabel("Y-Coordinate (mm)",fontsize = 16)

ax3.plot(mags,S0D0z,'*-',label="S0D0")
ax3.plot(mags,S1D0z,'*-',label="S1D0")
ax3.plot(mags,S0D1z,'*-',label="S0D1")
ax3.plot(mags,S1D1z,'*-',label="S1D1")

ax3.set_ylabel("Z-Coordinate (mm)",fontsize = 16)
ax3.tick_params(axis='both', which='major', labels=16)
ax3.set_xlabel("Magnification",fontsize = 16);

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In [8]: S0D0x = groups_init[(0,0)]['stds'].x.as_matrix()
        S1D0x = groups_init[(1,0)]['stds'].x.as_matrix()
        S0D1x = groups_init[(0,1)]['stds'].x.as_matrix()
        S1D1x = groups_init[(1,1)]['stds'].x.as_matrix()
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SOD0y = groups_init[(0,0)]['stds'].y.as_matrix()
S1D0y = groups_init[(1,0)]['stds'].y.as_matrix()
SOD1y = groups_init[(0,1)]['stds'].y.as_matrix()
S1D1y = groups_init[(1,1)]['stds'].y.as_matrix()

SOD0z = groups_init[(0,0)]['stds'].z.as_matrix()
S1D0z = groups_init[(1,0)]['stds'].z.as_matrix()
SOD1z = groups_init[(0,1)]['stds'].z.as_matrix()
S1D1z = groups_init[(1,1)]['stds'].z.as_matrix()

fig,(ax1,ax2,ax3) = plt.subplots(ncols=1,nrows=3,figsize = (10,14),sharex=True)
ax1.semilogy(mags,S1D0x,'*-',label="S1D0")
ax1.semilogy(mags,SOD1x,'*-',label="SOD1")
ax1.semilogy(mags,S1D1x,'*-',label="S1D1")

ax1.legend(loc=0,fontsize=16)
ax1.set_title("Standard Deviation of the X-Coordinate of the Centre - Magnification" \
,fontsize = 16)
ax1.set_ylabel("SD of x (mm)",fontsize = 16)
ax1.tick_params(axis='both', which='major', labels=16)
ax1.set_xlabel("Magnification",fontsize = 12);

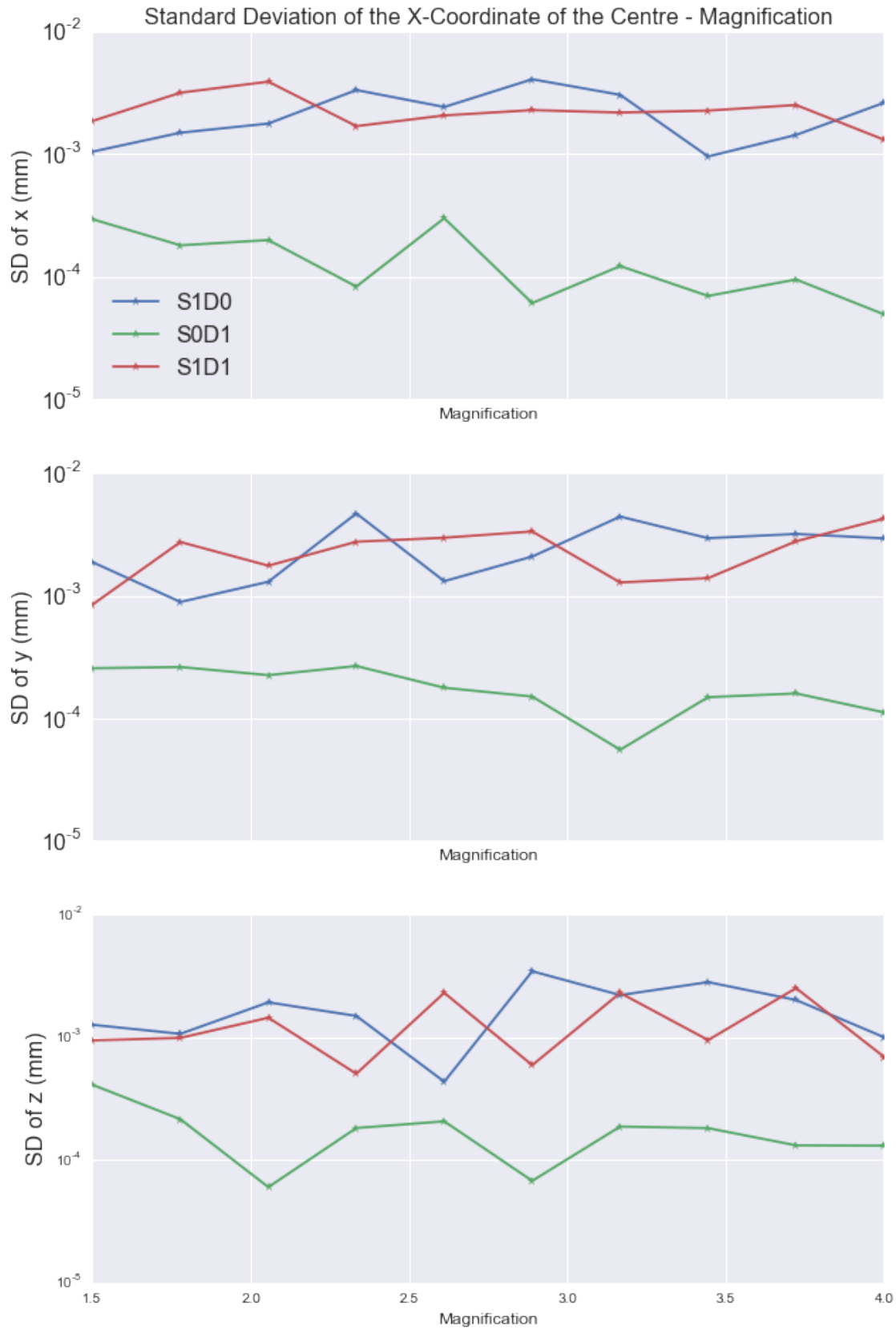
ax2.semilogy(mags,S1D0y,'*-',label="S1D0")
ax2.semilogy(mags,SOD1y,'*-',label="SOD1")
ax2.semilogy(mags,S1D1y,'*-',label="S1D1")

ax2.set_ylabel("SD of y (mm)",fontsize = 16)
ax2.tick_params(axis='both', which='major', labels=16)
ax2.set_xlabel("Magnification",fontsize = 12);

ax3.semilogy(mags,S1D0z,'*-',label="S1D0")
ax3.semilogy(mags,SOD1z,'*-',label="SOD1")
ax3.semilogy(mags,S1D1z,'*-',label="S1D1")

ax3.set_ylabel('SD of z (mm)',fontsize = 16)
ax2.tick_params(axis='both', which='major', labels=16)
ax3.set_xlabel("Magnification",fontsize = 12);
fig.subplots_adjust(top=1)

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In [9]: alldat2 = pd.read_pickle("RadiusCentreExtraSamples.p")

In [10]: mags = mags[[0,2,-1]]
        alldat3 = alldat2[(alldat2.mag == 4.) | (alldat2.mag == 2.0556) | (alldat2.mag == 1.5)]

        grouped_extra = alldat3.groupby(['Soffset', 'Doffset'])

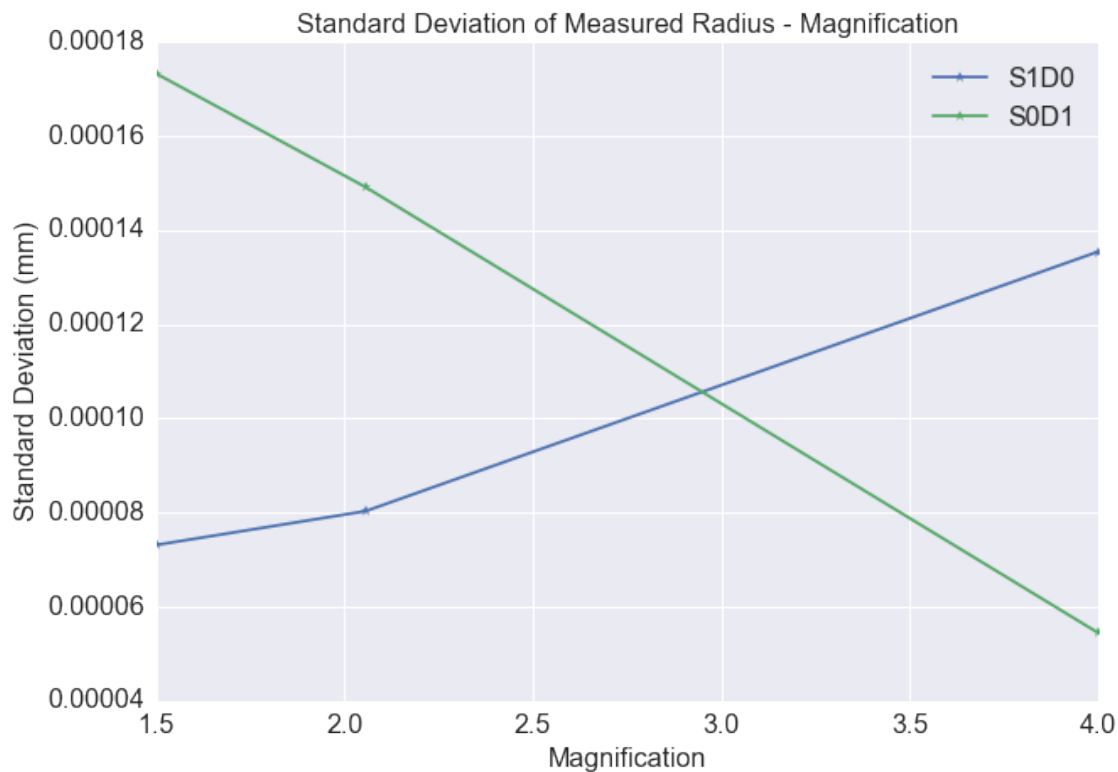
        groups_extra = {}
        for a,b in grouped_extra:
            group = b[['R','x','y','z','mag','Soffset','Doffset']]
            groups_extra[a] = {'means':group.groupby("mag").mean(),
                              'vars':group.groupby("mag").var(ddof=1),
                              'stds':group.groupby("mag").std(ddof=1)}

In [11]: S1D0 = groups_extra[(1,0)]['stds'].R.as_matrix()
        S0D1 = groups_extra[(0,1)]['stds'].R.as_matrix()
        S1D1 = groups_extra[(1,1)]['stds'].R.as_matrix()

        fig,ax = plt.subplots(ncols=1,nrows=1,figsize = (10,7))
        ax.plot(mags,S1D0,'*-',label="S1D0")
        ax.plot(mags,S0D1,'*-',label="S0D1")

        ax.legend(loc=0,fontsize=16)
        ax.set_title("Standard Deviation of Measured Radius - Magnification",fontsize = 16)
        ax.set_ylabel("Standard Deviation (mm)",fontsize = 16)
        ax.tick_params(axis='both', which='major', labels=16)
        ax.set_xlabel("Magnification",fontsize = 16);

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In [ ]: