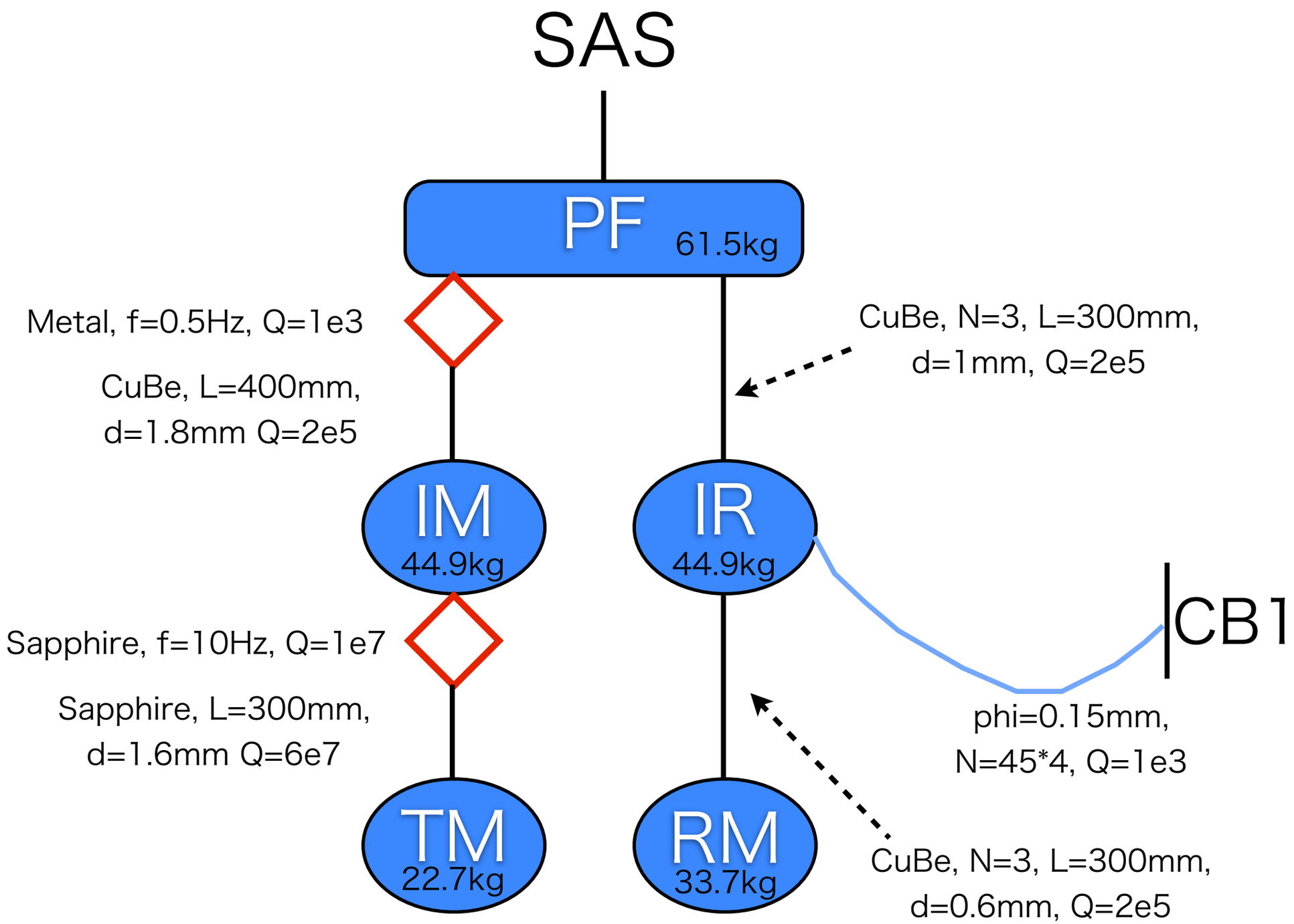
Vibration through heat links

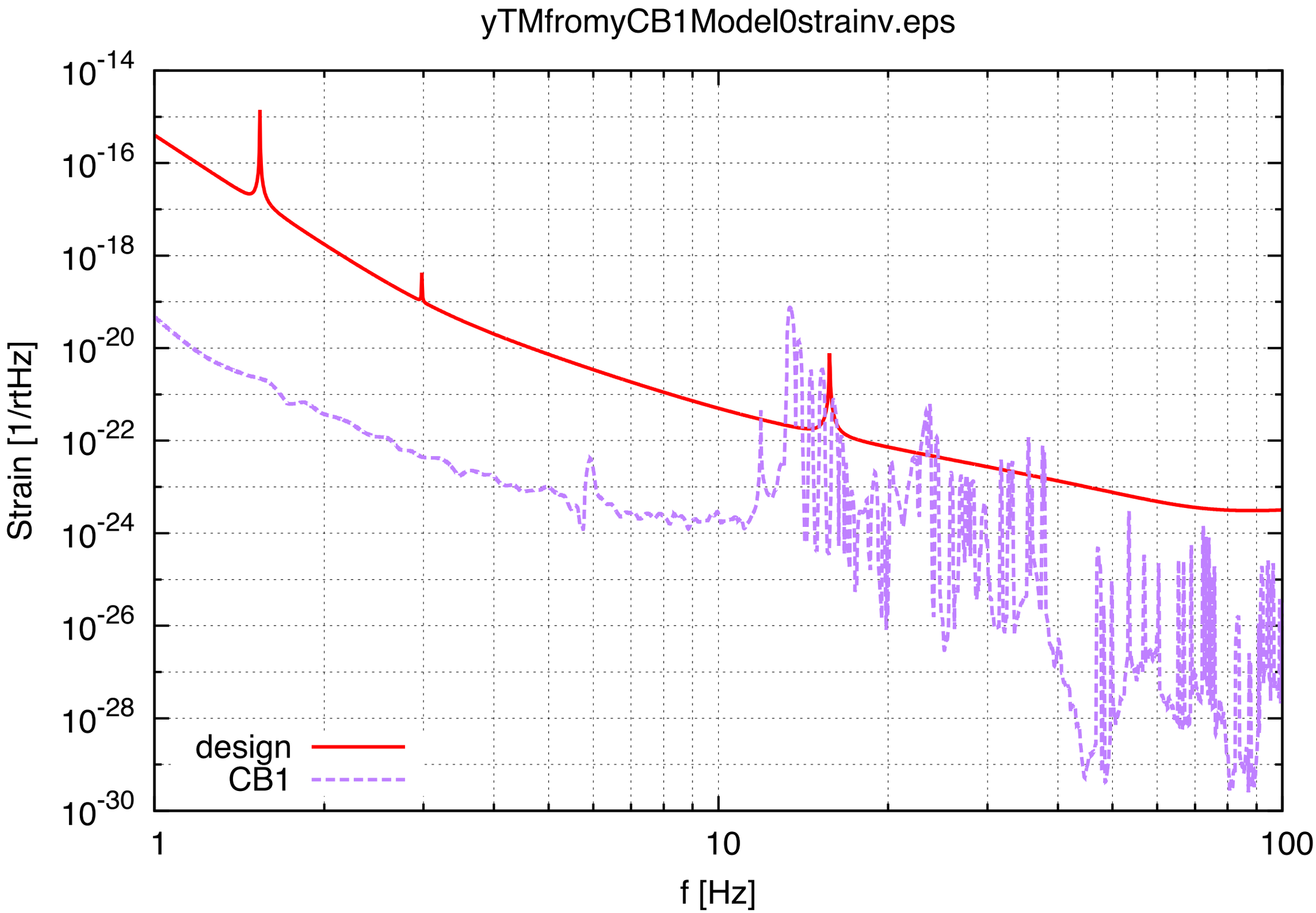
Dan Chen

2014/2/18 Cryo-payload meeting

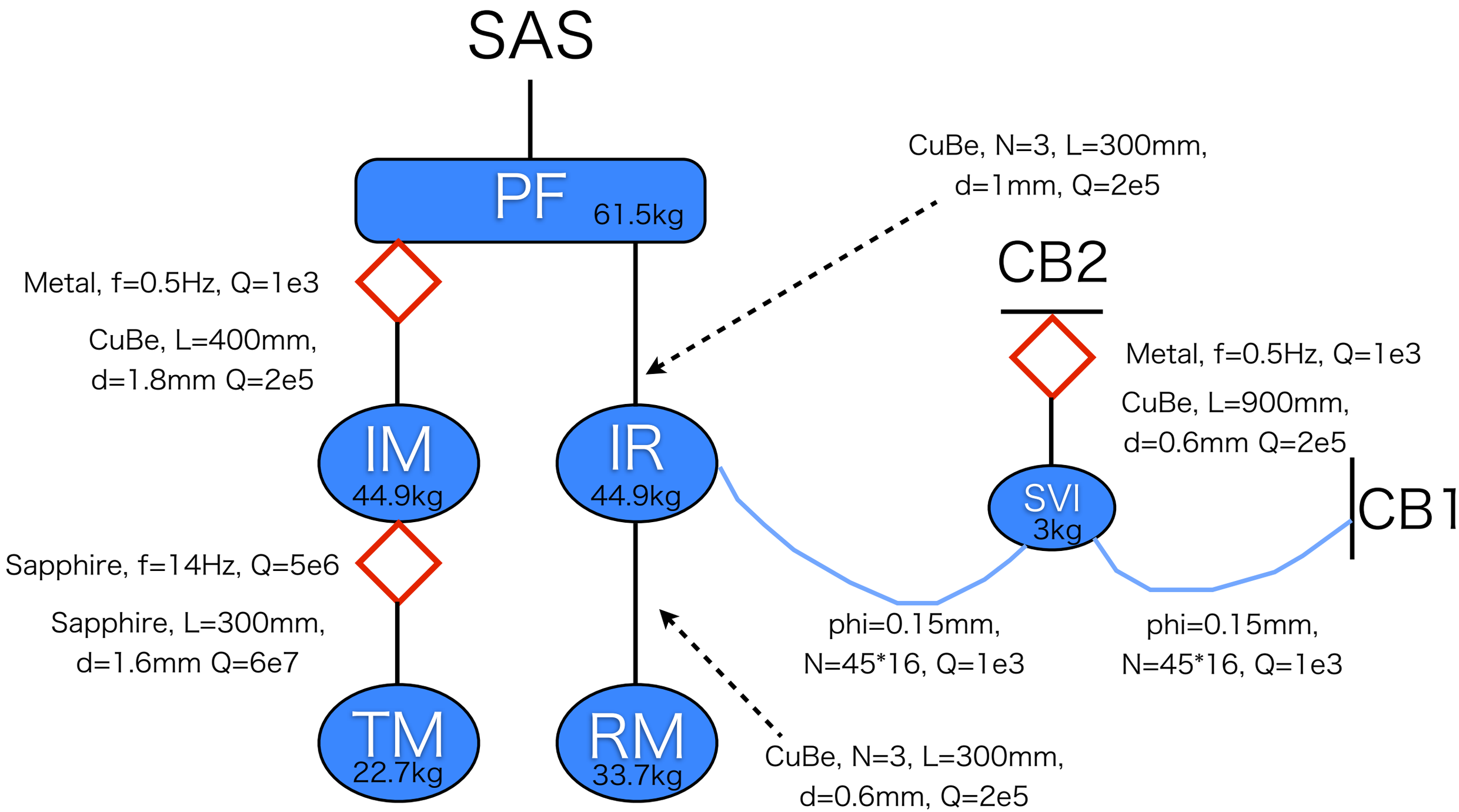
Model 0


SAS
PF
61.5kg
Metal, f=0.5Hz, Q=1e3
CuBe, L=400mm,
d=1.8mm Q=2e5
CuBe, N=3, L=300mm,
d=1mm, Q=2e5
IM
44.9kg
IR
44.9kg
Sapphire, f=10Hz, Q=1e7
Sapphire, L=300mm,
d=1.6mm Q=6e7
CB1
phi=0.15mm,
N=45*4, Q=1e3
TM
22.7kg
RM
33.7kg
CuBe, N=3, L=300mm,
d=0.6mm, Q=2e5

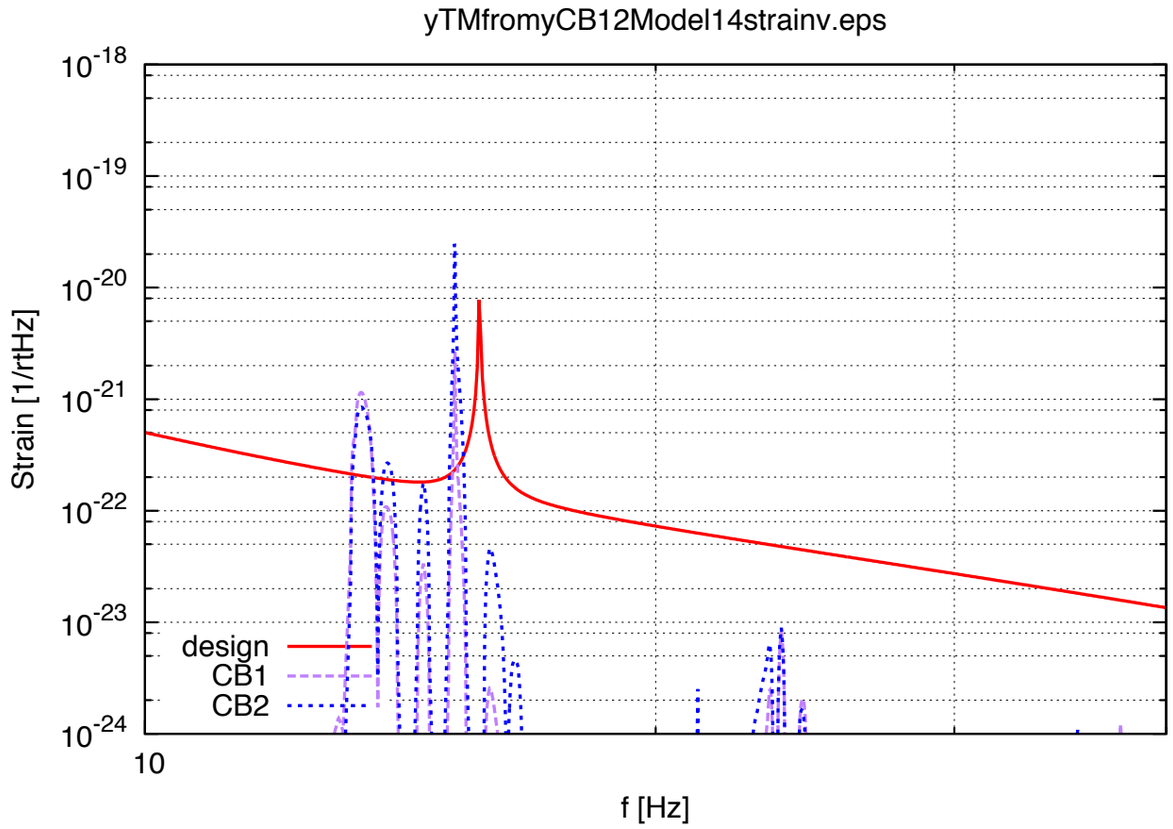
Model 0

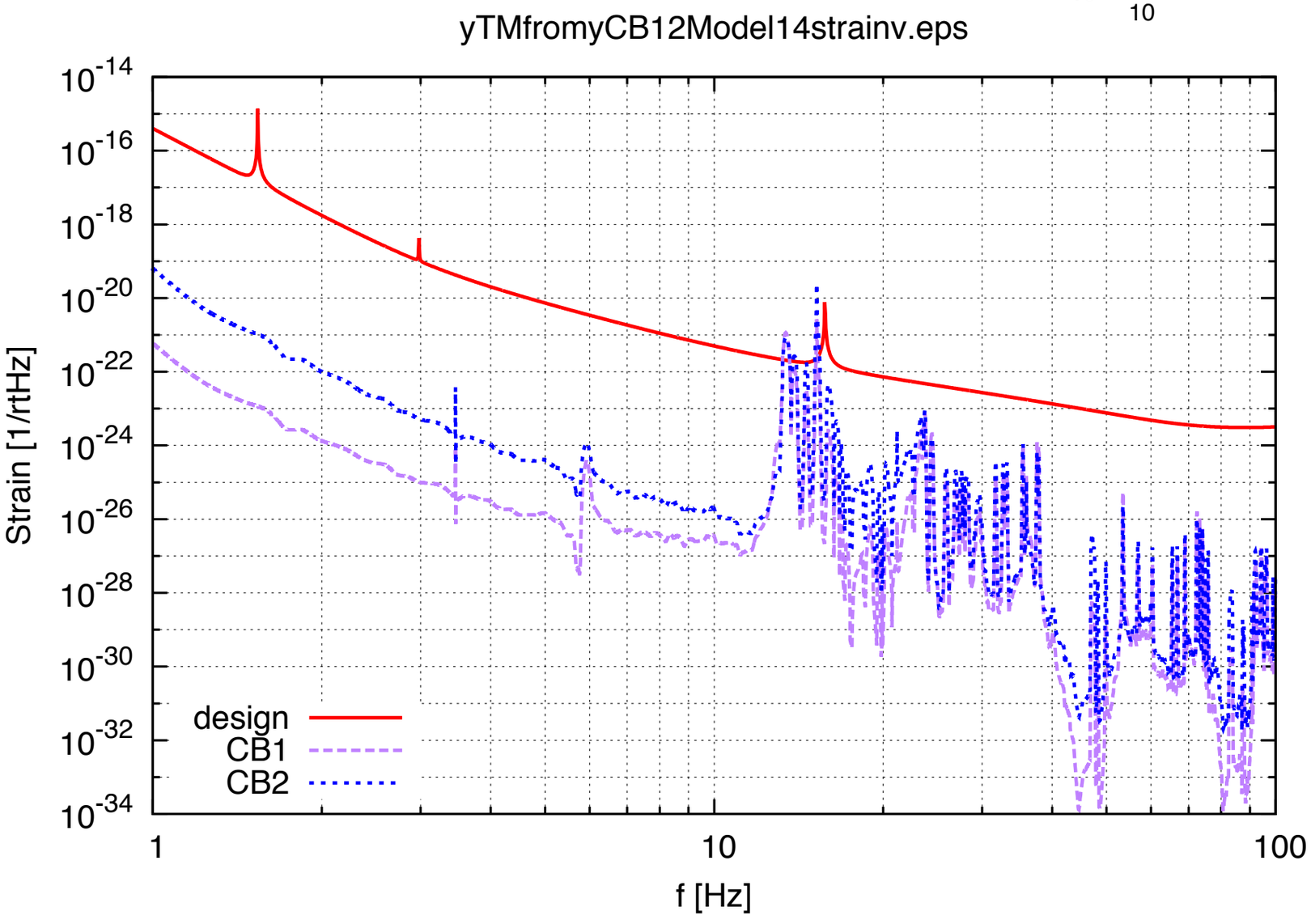

yTMfromyCB1Model0strainv.eps
Strain [1/rtHz]
10-14
10-16
10-18
10-20
10-22
10-24
10-26
10-28
10-30
1
10
100
f [Hz]
design
CB1

Model A(14)

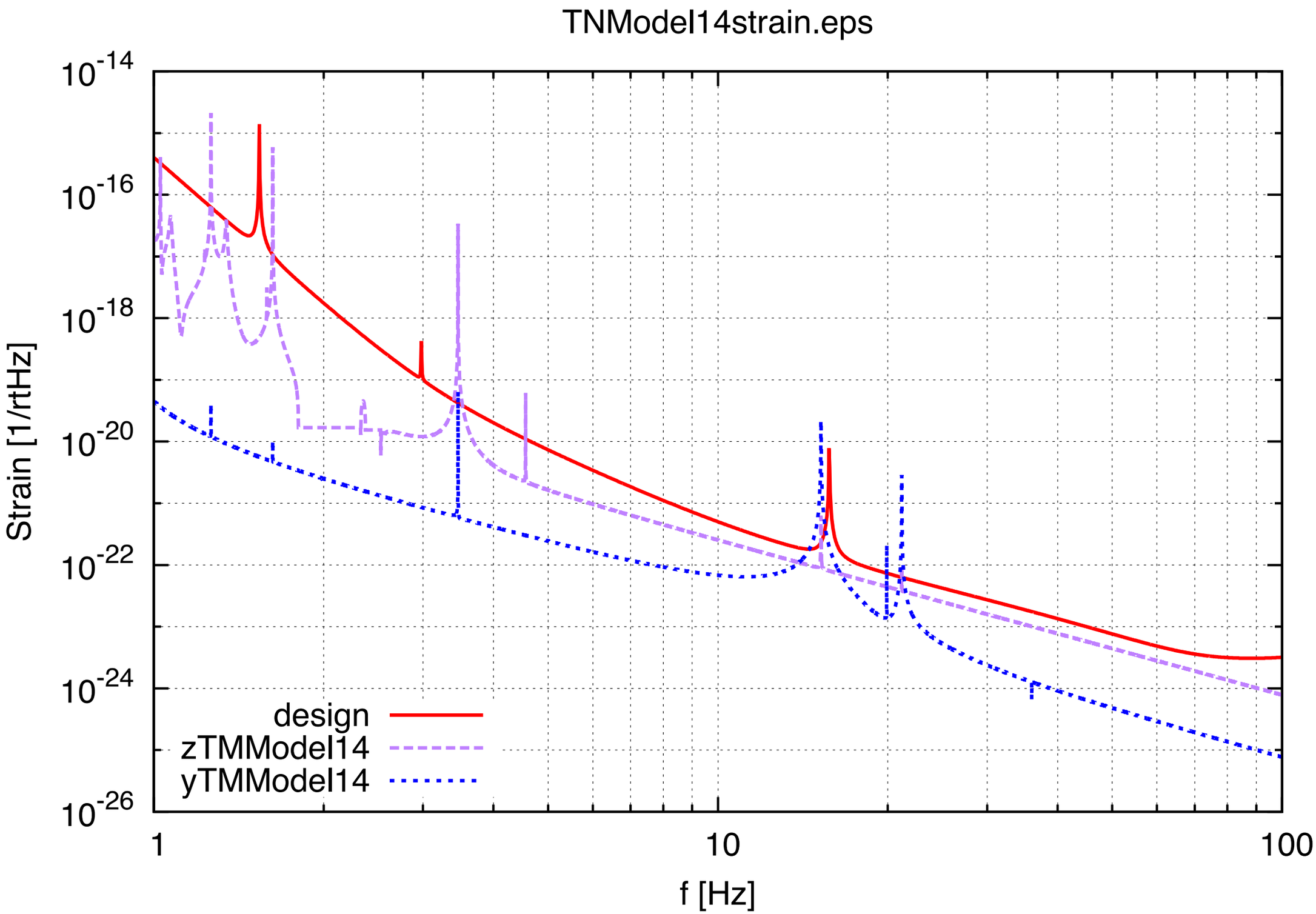

SAS
PF
61.5kg
CuBe, N=3, L=300mm,
d=1mm, Q=2e5
CB2
Metal, f=0.5Hz, Q=1e3
CuBe, L=900mm,
d=0.6mm Q=2e5
Metal, f=0.5Hz, Q=1e3
CuBe, L=400mm,
d=1.8mm Q=2e5
IM
44.9kg
IR
44.9kg
SVI
3kg
CB1
Sapphire, f=14Hz, Q=5e6
Sapphire, L=300mm,
d=1.6mm Q=6e7
phi=0.15mm,
N=45*16, Q=1e3
phi=0.15mm,
N=45*16, Q=1e3
TM
22.7kg
RM
33.7kg
CuBe, N=3, L=300mm,
d=0.6mm, Q=2e5

Model A

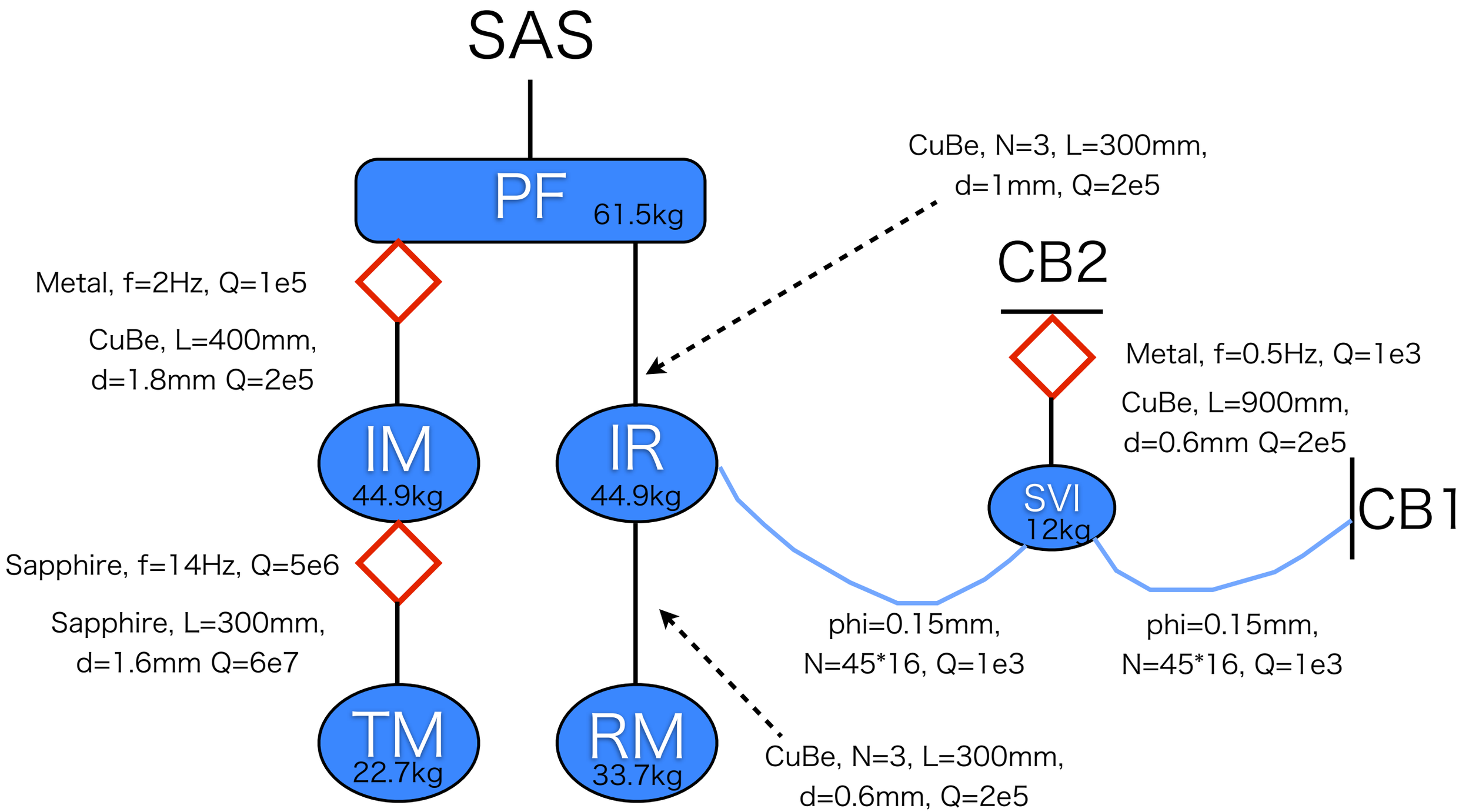

yTMfromyCB12Model14strainv.eps
Strain [1/rtHz]
f [Hz]
design
CB1
CB2


yTMfromyCB12Model14strainv.eps
Strain [1/rtHz]
f [Hz]
design
CB1
CB2

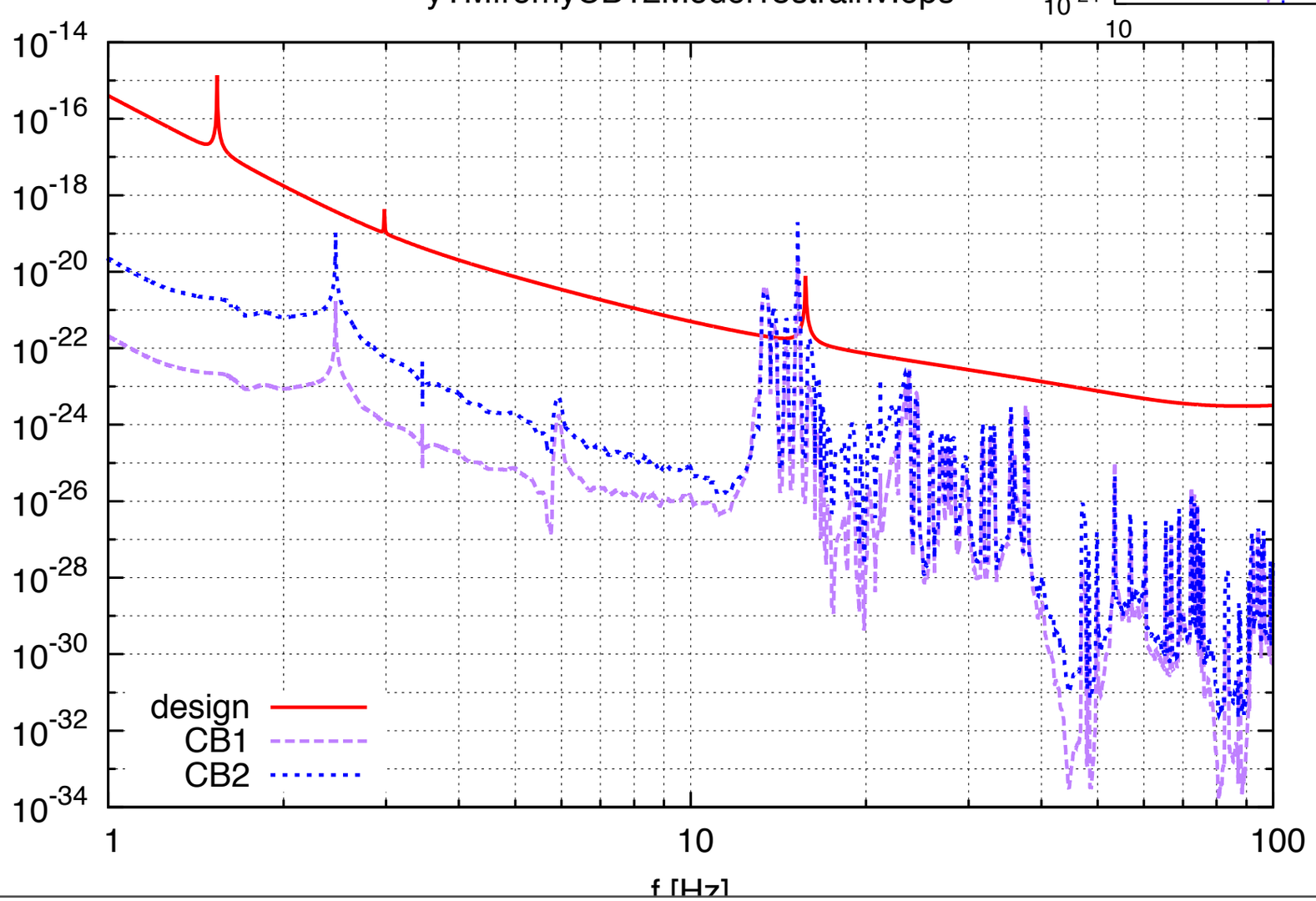
Model A

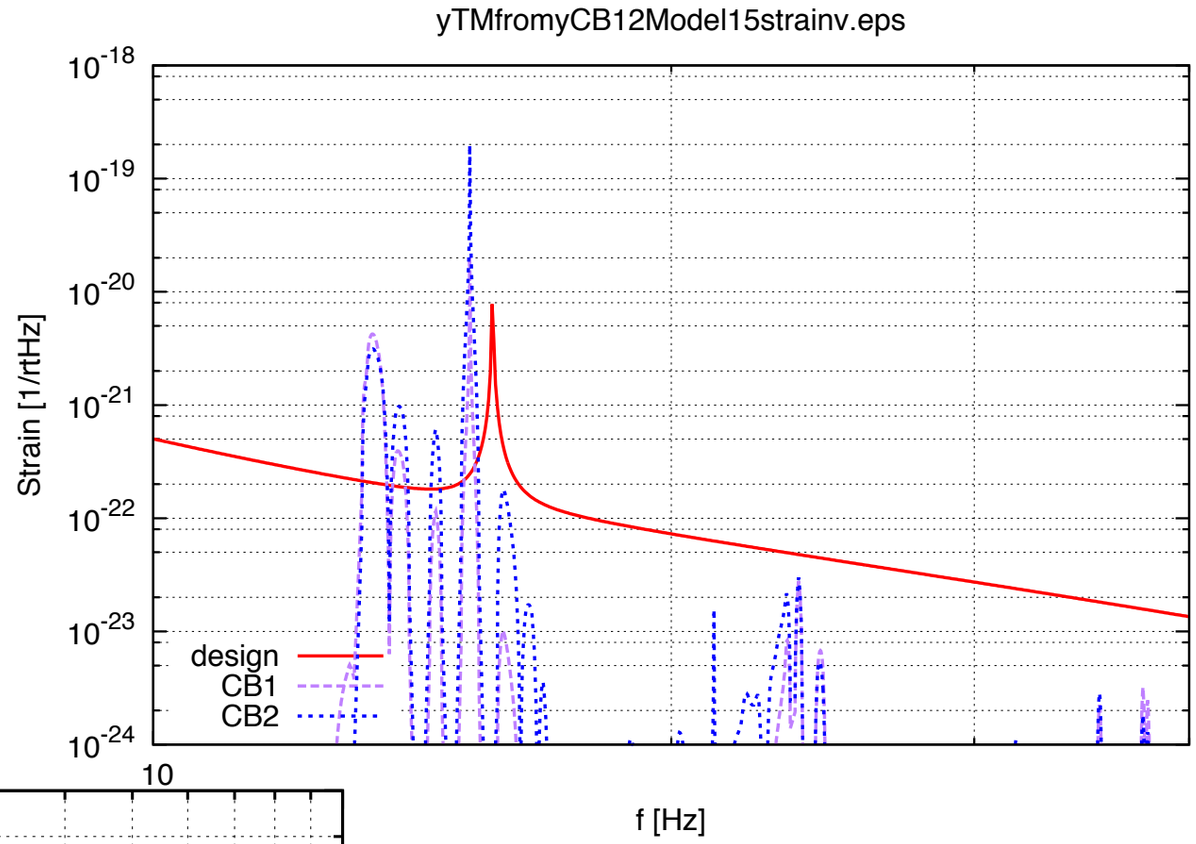

TNModel14strain.eps
Strain [1/rtHz]
10^-14
10^-16
10^-18
10^-20
10^-22
10^-24
10^-26
1
10
100
f [Hz]
design
zTMModel14
yTMModel14

Model B(15)

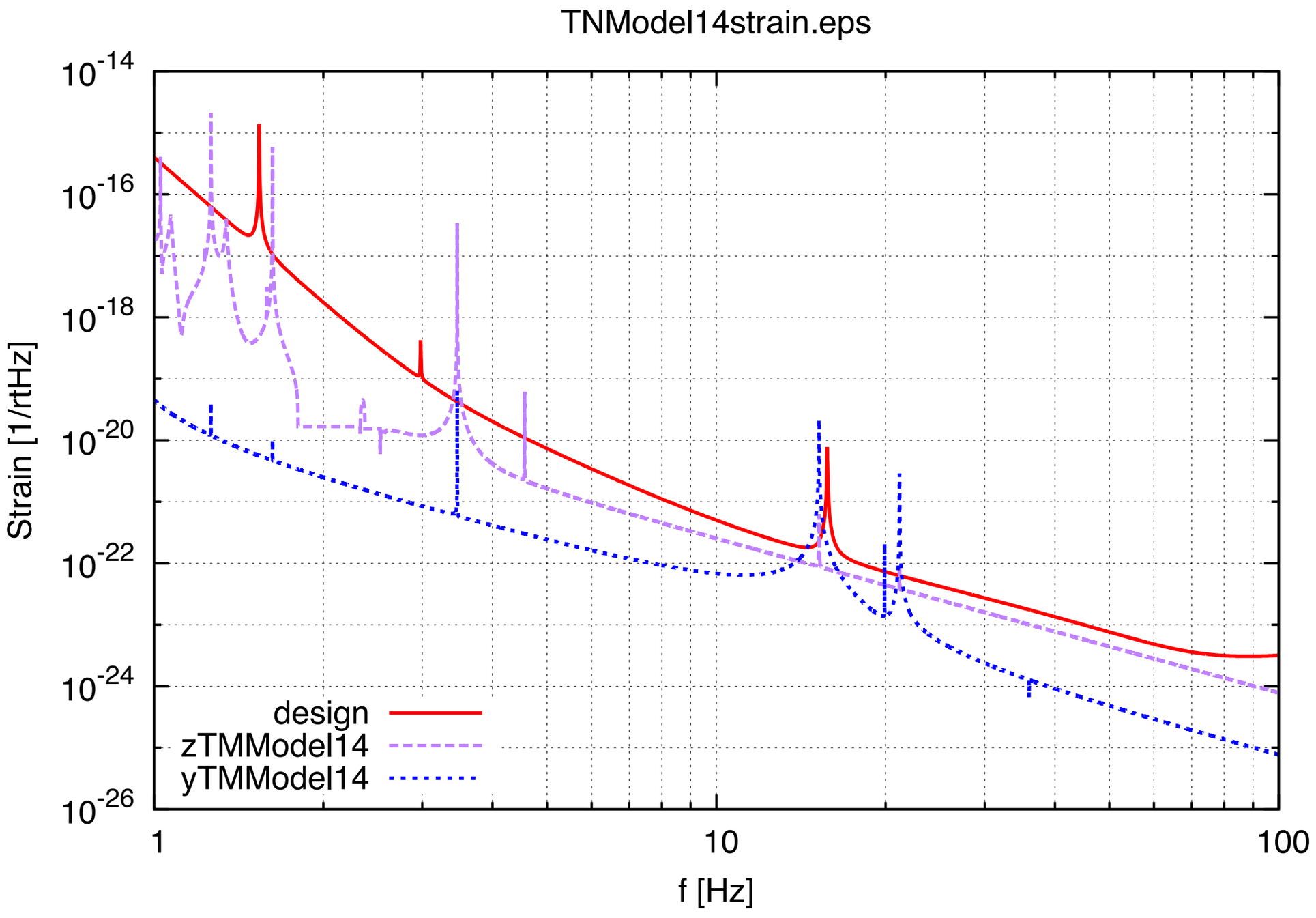

SAS
PF
61.5kg
Metal, f=2Hz, Q=1e5
CuBe, L=400mm,
d=1.8mm Q=2e5
IM
44.9kg
Sapphire, f=14Hz, Q=5e6
Sapphire, L=300mm,
d=1.6mm Q=6e7
TM
22.7kg
IR
44.9kg
RM
33.7kg
CuBe, N=3, L=300mm,
d=0.6mm, Q=2e5
CuBe, N=3, L=300mm,
d=1mm, Q=2e5
CB2
Metal, f=0.5Hz, Q=1e3
CuBe, L=900mm,
d=0.6mm Q=2e5
SVI
12kg
CB1
phi=0.15mm,
N=45*16, Q=1e3
phi=0.15mm,
N=45*16, Q=1e3

Model B

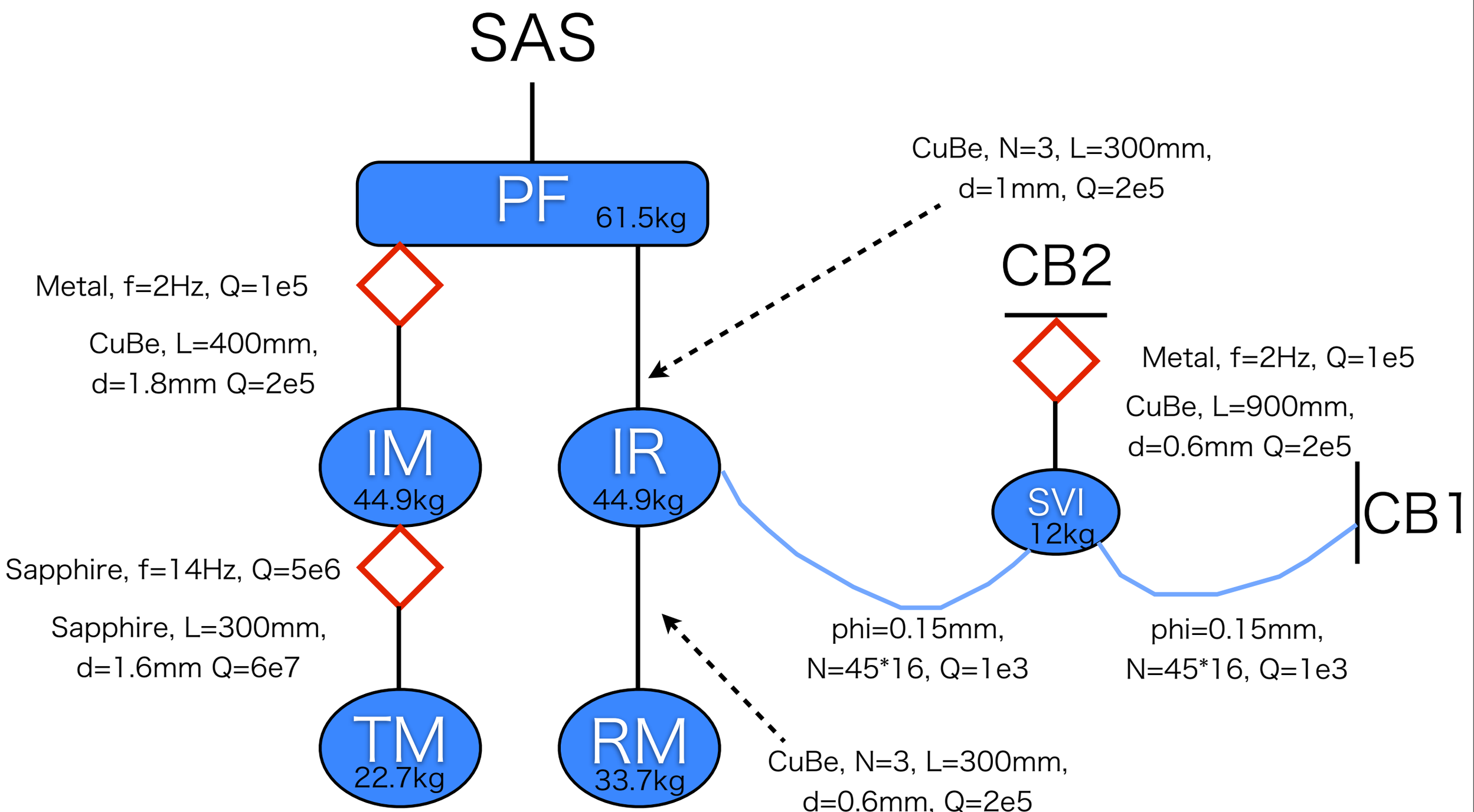

yTMfromyCB12Model15strainv.eps
Strain [1/rtHz]
f [Hz]
design
CB1
CB2
10^-14
10^-16
10^-18
10^-20
10^-22
10^-24
10^-26
10^-28
10^-30
10^-32
10^-34
1
10
100


yTMfromyCB12Model15strainv.eps
Strain [1/rtHz]
f [Hz]
design
CB1
CB2
10^-18
10^-19
10^-20
10^-21
10^-22
10^-23
10^-24
10

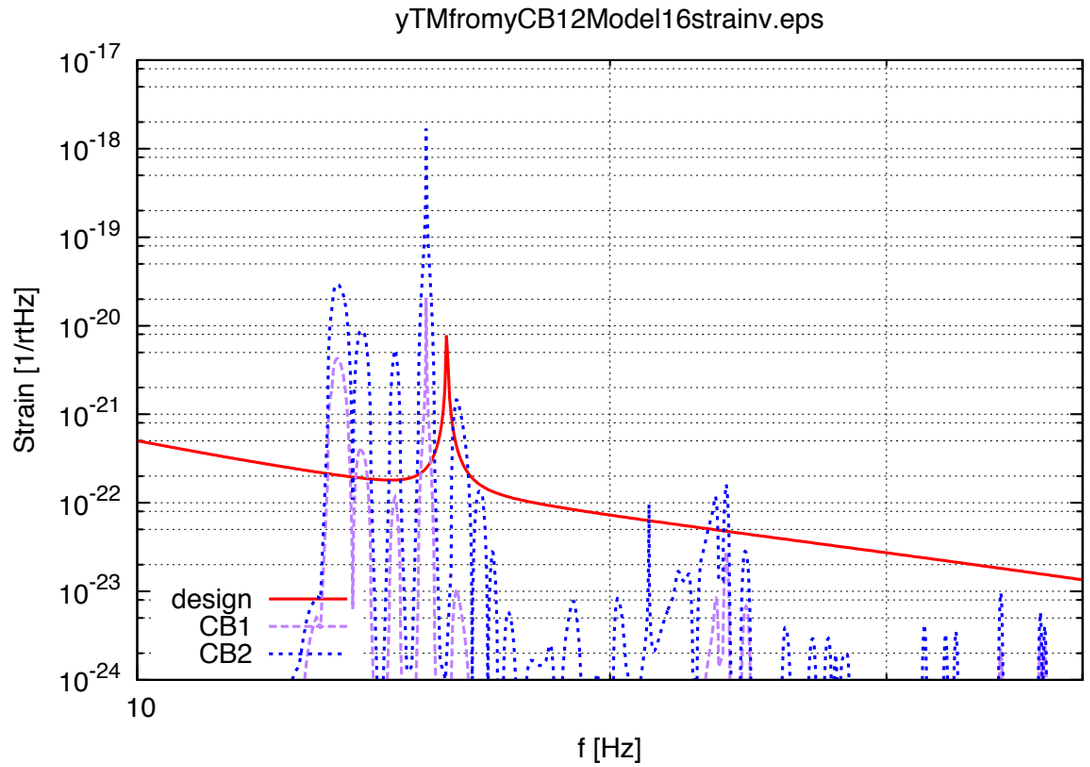
Model B

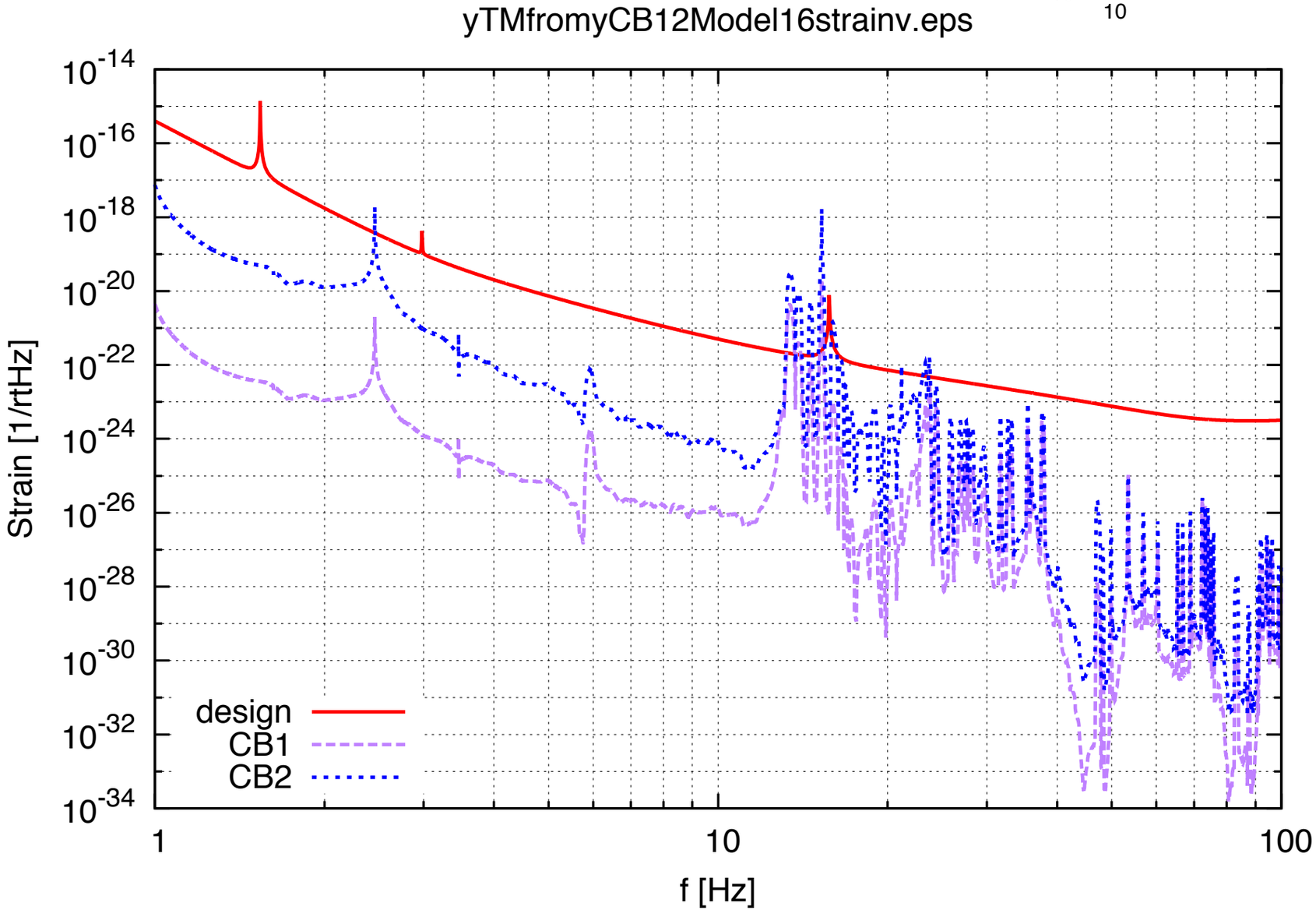

TNModel14strain.eps
Strain [1/rtHz]
10-14
10-16
10-18
10-20
10-22
10-24
10-26
1
10
100
f [Hz]
design
zTMModel14
yTMModel14

Model C(16)

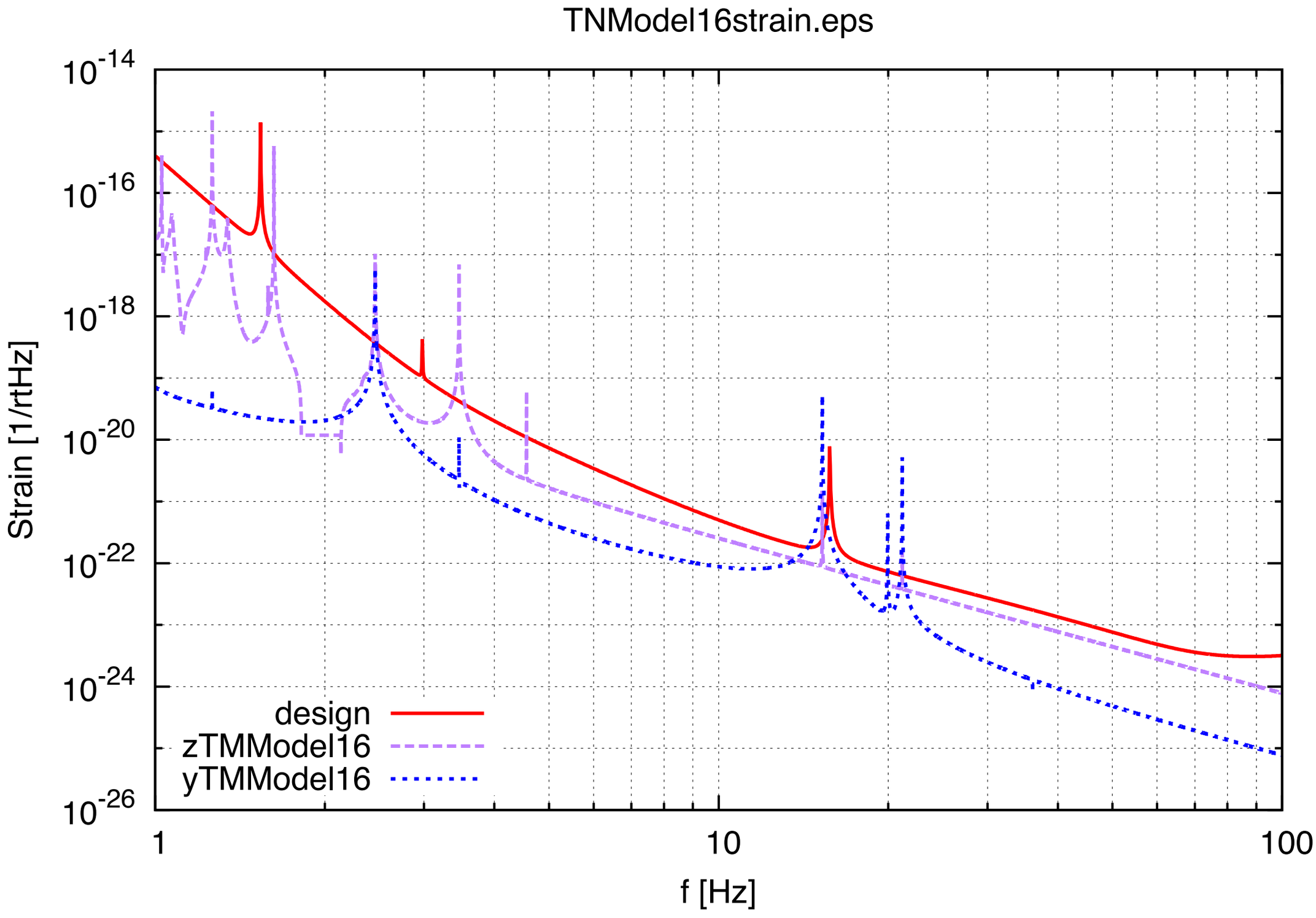

SAS
PF
61.5kg
Metal, f=2Hz, Q=1e5
CuBe, L=400mm,
d=1.8mm Q=2e5
IM
44.9kg
Sapphire, f=14Hz, Q=5e6
Sapphire, L=300mm,
d=1.6mm Q=6e7
TM
22.7kg
IR
44.9kg
RM
33.7kg
CuBe, N=3, L=300mm,
d=1mm, Q=2e5
CB2
Metal, f=2Hz, Q=1e5
CuBe, L=900mm,
d=0.6mm Q=2e5
SVI
12kg
CB1
phi=0.15mm,
N=45*16, Q=1e3
phi=0.15mm,
N=45*16, Q=1e3
CuBe, N=3, L=300mm,
d=0.6mm, Q=2e5

Model C

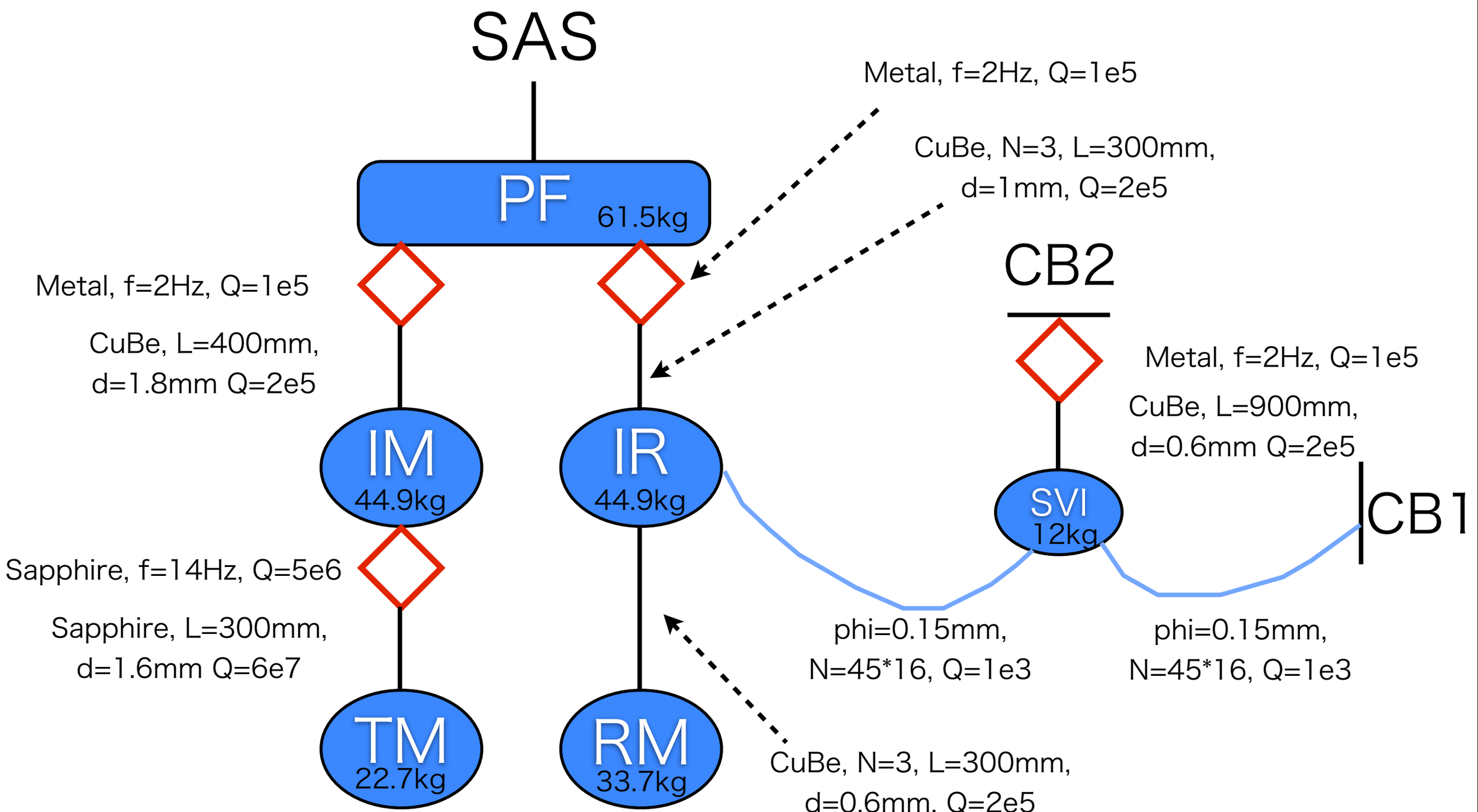

yTMfromyCB12Model16strainv.eps
Strain [1/rtHz]
f [Hz]
design
CB1
CB2


yTMfromyCB12Model16strainv.eps
Strain [1/rtHz]
f [Hz]
design
CB1
CB2

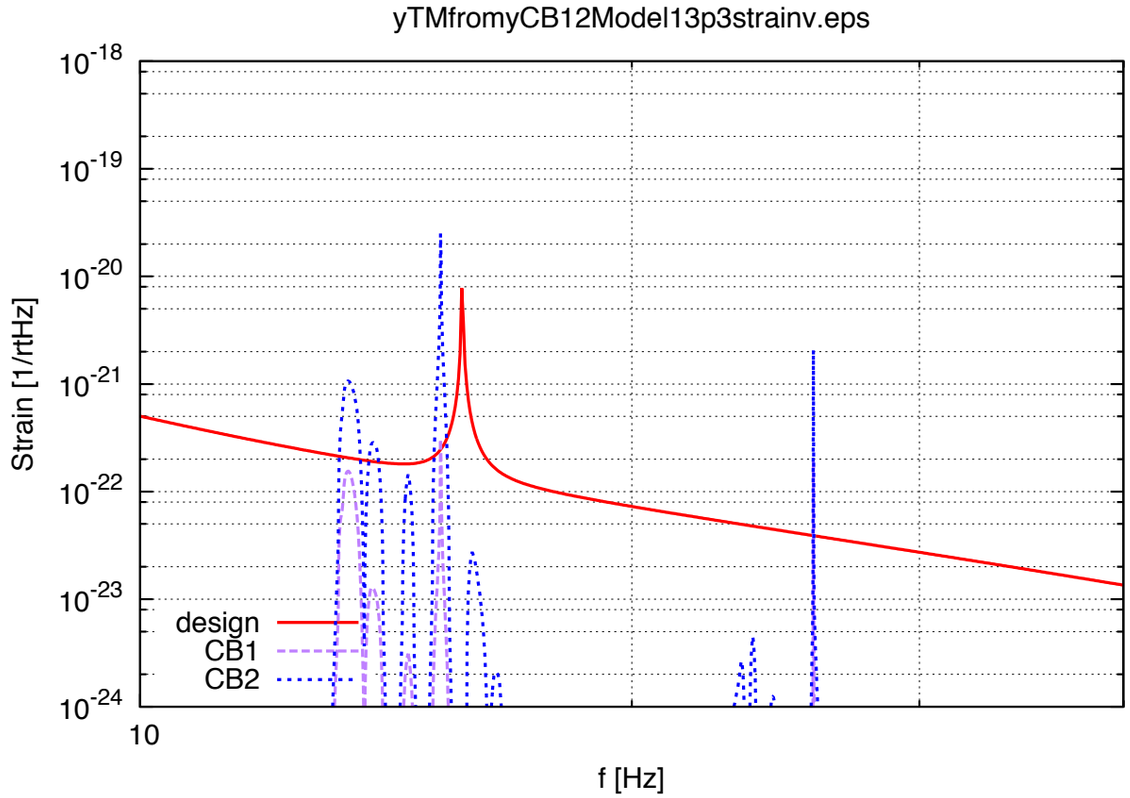
Model C

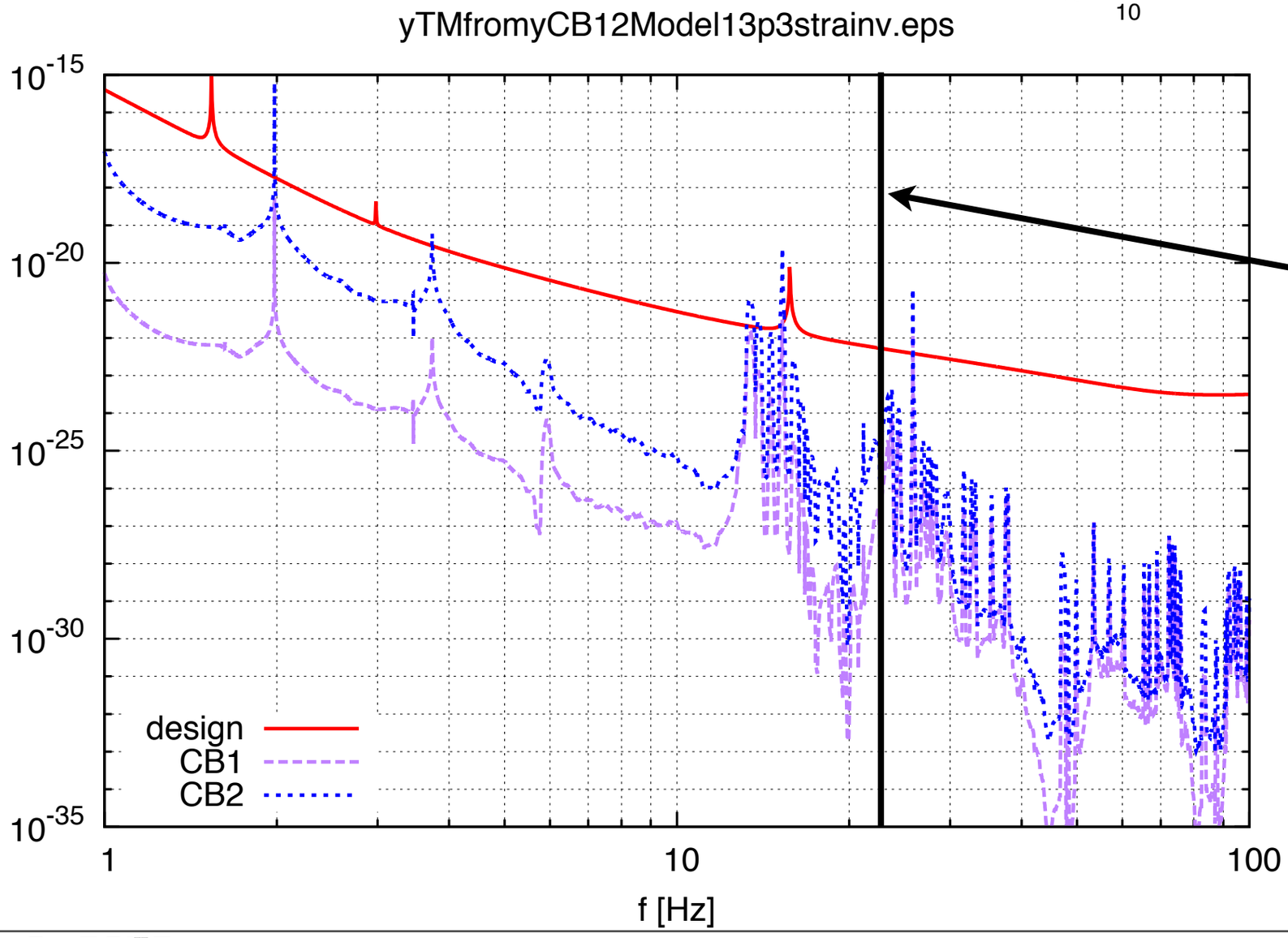

TNModel16strain.eps
Strain [1/rtHz]
10-14
10-16
10-18
10-20
10-22
10-24
10-26
1
10
100
f [Hz]
design
zTMModel16
yTMModel16

Model D(13p3)


SAS
PF
61.5kg
Metal, f=2Hz, Q=1e5
CuBe, N=3, L=300mm,
d=1mm, Q=2e5
CB2
Metal, f=2Hz, Q=1e5
CuBe, L=900mm,
d=0.6mm Q=2e5
SVI
12kg
CB1
Metal, f=2Hz, Q=1e5
CuBe, L=400mm,
d=1.8mm Q=2e5
IM
44.9kg
IR
44.9kg
Sapphire, f=14Hz, Q=5e6
Sapphire, L=300mm,
d=1.6mm Q=6e7
phi=0.15mm,
N=45*16, Q=1e3
phi=0.15mm,
N=45*16, Q=1e3
TM
22.7kg
RM
33.7kg
CuBe, N=3, L=300mm,
d=0.6mm, Q=2e5

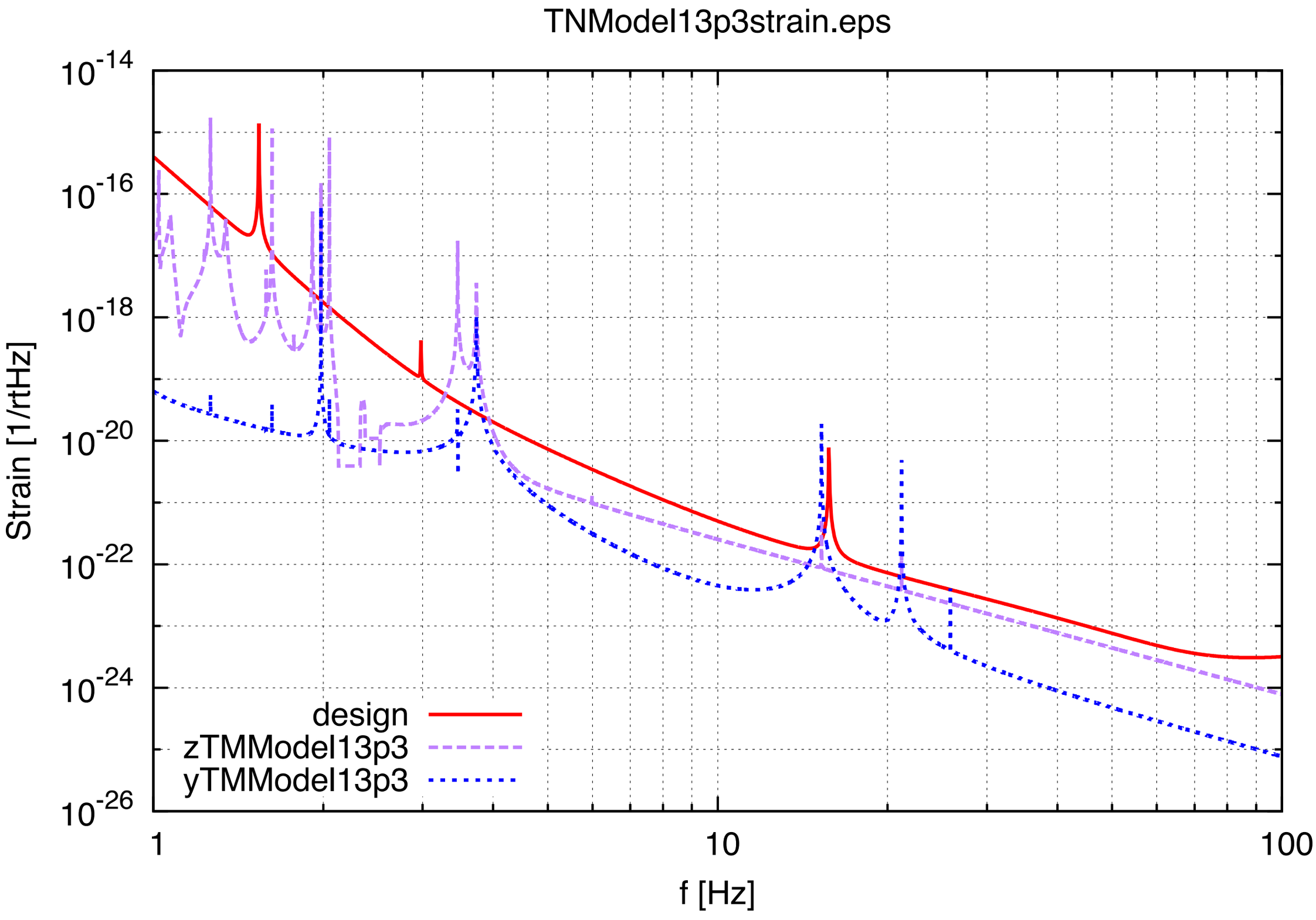
Model D



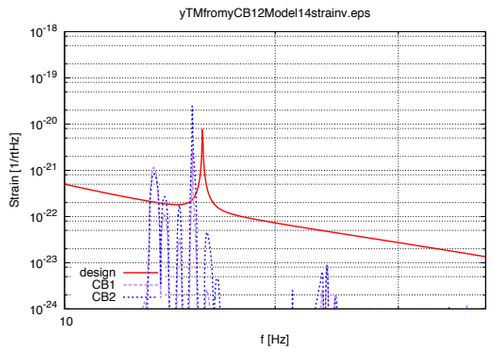
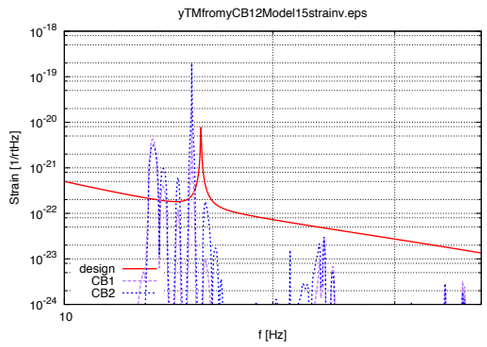
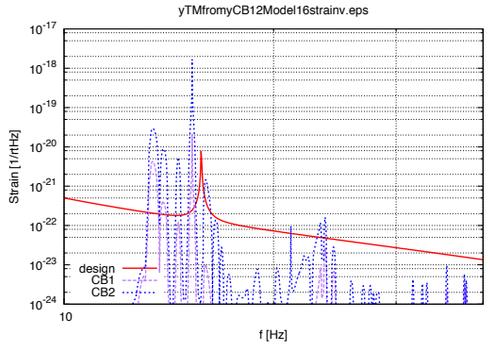
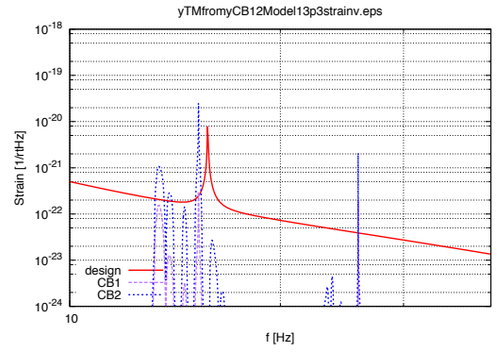


22.5Hz

Model D


TNModel13p3strain.eps
Strain [1/rtHz]
10^-14
10^-16
10^-18
10^-20
10^-22
10^-24
10^-26
1
10
100
f [Hz]
design
zTMModel13p3
yTMModel13p3

Summary

Model	A	B	C	D
Vibration	○? 	△ 	× 	○? 
Vertical spring	0.5Hz + 0.5Hz	0.5Hz + 2Hz	2Hz + 2Hz	2Hz + 2Hz + 2Hz
Advantage			No GAS filter	No GAS filter
Dis-advantage	2 GAS filters (0.5Hz)			Vertical springs for IMR

Open questions

1. How much room is available for additional pendulums?
2. Can we put vertical springs for IMR on PF?

END

PD

Name	Type	Peak	We have	comment	Status
S1223-01	Si PIN PD	960 nm	5	We had a cooling test. Efficiency decreases at low T (37%)	Test: done Analysis: done
G8370-01	InGaAs PIN PD	1550 nm	0	Tomaru-san said this works at low T. I asked a quotation but is was out of stock.	-
FGA21	InGaAs Pin PD	1600 nm	2	The quantum efficiency decreases at low T(15%).	Test: done Analysis: done
FDG03	Ge PD	1550 nm	2	We ordered. ThourLab said it works at low T.	Test: done Analysis: done
S3590	Si PIN PD	980 nm	2	We can order. But LED doesn’t work.	Test: not yet Analysis: not yet

LED

Name	Type	Peak	Number we have in ICRR	comment	Status
OP232	GaAIAs	890 nm	5	This is used in OSEM at room temperature.	Test: not yet Analysis: not yet
L2656-03	GaAlAs	890 nm	20	Tomaru-san said this works at low T. I received.	Test: not yet Analysis: not yet
ML925B45F	InGaAsP	1550 nm	2		Test: done Analysis: done