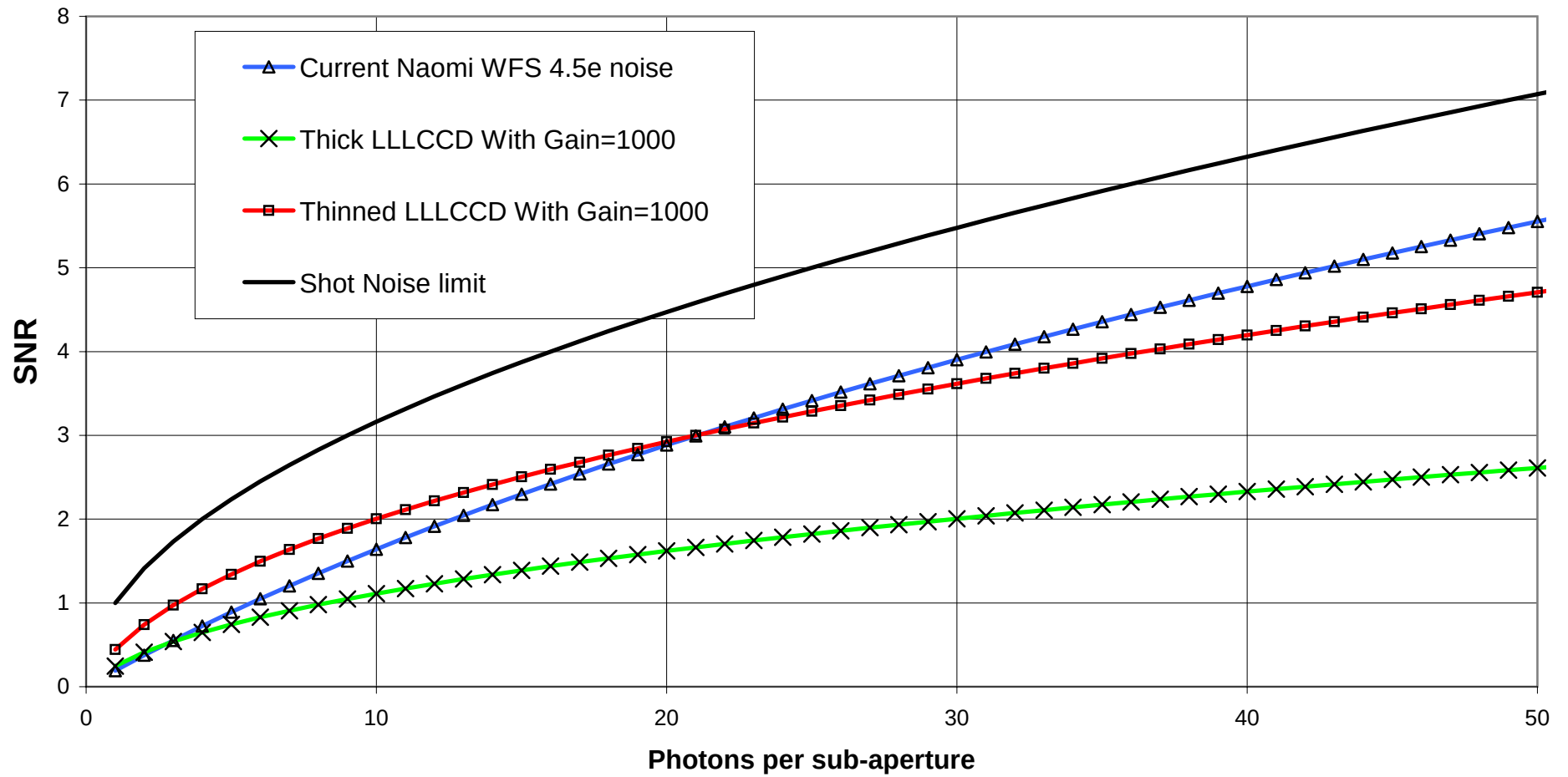


NAOMI LGS WFS DETECTOR OPTIONS



Rayleigh LGS WFS Detector - Conventional CCD compared with Marconi L3CCD (Internal Gain)

	Current NAOMI WFS	Thick LLLCCD With Gain=1000	Thinned LLLCCD With Gain=1000	Shot Noise limit
QE @ 523nm	0,91	0,28	0,91	1
DARK CURRENT (e-/pix/sec)	20	0,3	0,3	
PIXELS IN SUB-APERTURE	4	4	4	
TOTAL BACKGROUND	1,52	1,323	1,323	0
NOISE (e)	4,5	20	20	0
GAIN	1	1000	1000	1
EFFECTIVE QE FACTOR	1	0,5	0,5	1
INTEGRATION TIME (ms)	10			
SKY (photons/sub-ap/sec)	600			
THROUGHPUT NAOMI+TEL	0,22			

Notes:

- 1) The WFS centroiding algorithm does not work well if it has less than approx 50 electrons per subaperture
- 2) The light in each subaperture will be spread over at least 6 pixels
- 3) Numbers in table above can be adjusted for experimentation.
- 4) Effective QE factor an unavoidable part of the L3CCD multiplication process
- 5) Throughput of TEL + NAOMI + WFS is estimated as 0.22
- 6) Sky brightness is variable between 25 - 1250 photons/sec/arcsec² for WHT and 10nm bandpass.

Photons per sub-aperture	Current Naomi WFS 4.5e n	Thick LLLCCD With Gain=1000	Thinned LLLCCD With Gain=1000	Shot Noise limit
1	0,191660938	0,245342338	0,442485386	1
2	0,375811733	0,410338454	0,739968246	1,414213562
3	0,553089587	0,539695983	0,973173291	1,732050808
4	0,724054516	0,648528778	1,169369054	2
5	0,88920119	0,743831099	1,341170285	2,236067977
6	1,048968607	0,829442043	1,495499819	2,449489743
7	1,203748063	0,907710962	1,636593628	2,645751311
8	1,353889746	0,980188551	1,767247468	2,828427125
9	1,499708252	1,04795702	1,889412361	3
10	1,641487203	1,11180463	2,004509348	3,16227766
11	1,779483147	1,172325301	2,113609092	3,31662479
12	1,913928878	1,229978974	2,217540715	3,464101615
13	2,045036247	1,285130001	2,316961018	3,605551275
14	2,172998595	1,338072567	2,412400308	3,741657387
15	2,297992824	1,389048088	2,504293765	3,872983346

16	2,420181203	1,438257462	2,593003534	4
17	2,53971293	1,48586992	2,678834668	4,123105626
18	2,656725487	1,532029544	2,762046892	4,242640687
19	2,771345834	1,576860173	2,842863435	4,358898944
20	2,883691449	1,620469143	2,921477783	4,472135955
21	2,993871246	1,662950193	2,998058908	4,582575695
22	3,101986385	1,704385744	3,072755383	4,69041576
23	3,20813099	1,744848715	3,145698651	4,795831523
24	3,312392781	1,78440398	3,217005654	4,898979486
25	3,414853645	1,823109551	3,286780964	5
26	3,51559014	1,861017551	3,355118538	5,099019514
27	3,614673945	1,898175011	3,422103153	5,196152423
28	3,712172269	1,934624538	3,487811613	5,291502622
29	3,80814821	1,970404875	3,552313758	5,385164807
30	3,902661088	2,005551373	3,61567331	5,477225575
31	3,995766741	2,040096388	3,677948596	5,567764363
32	4,087517789	2,074069629	3,739193167	5,656854249
33	4,177963878	2,107498443	3,799456322	5,744562647
34	4,267151903	2,140408075	3,858783567	5,830951895
35	4,355126204	2,172821885	3,917217011	5,916079783
36	4,441928753	2,204761537	3,974795706	6
37	4,527599316	2,236247168	4,031555952	6,08276253
38	4,612175607	2,267297535	4,087531558	6,164414003
39	4,69569343	2,297930139	4,142754076	6,244997998
40	4,778186802	2,328161344	4,197253002	6,32455532
41	4,859688072	2,358006477	4,251055964	6,403124237
42	4,94022803	2,387479914	4,304188879	6,480740698
43	5,019836005	2,416595165	4,356676098	6,557438524
44	5,098539958	2,445364941	4,408540537	6,633249581
45	5,176366564	2,473801223	4,45980379	6,708203932
46	5,253341289	2,501915313	4,510486235	6,782329983
47	5,329488469	2,529717895	4,560607127	6,8556546
48	5,404831369	2,557219072	4,610184681	6,92820323
49	5,479392249	2,584428417	4,659236152	7
50	5,55319242	2,611355005	4,707777901	7,071067812
51	5,6262523	2,638007454	4,755825461	7,141428429

52	5,698591462	2,664393951	4,803393592	7,211102551
53	5,770228678	2,690522287	4,850496336	7,280109889
54	5,841181968	2,716399877	4,897147064	7,348469228
55	5,911468635	2,742033792	4,943358519	7,416198487
56	5,981105305	2,767430776	4,989142858	7,483314774
57	6,050107963	2,792597267	5,034511688	7,549834435
58	6,118491984	2,817539418	5,0794761	7,615773106
59	6,186272165	2,842263113	5,124046703	7,681145748
60	6,253462755	2,866773985	5,168233648	7,745966692
61	6,320077478	2,891077428	5,212046661	7,810249676
62	6,386129564	2,915178611	5,25549506	7,874007874
63	6,45163177	2,939082496	5,298587788	7,937253933
64	6,516596401	2,962793843	5,341333426	8
65	6,581035336	2,986317222	5,383740215	8,062257748
66	6,644960043	3,00965703	5,425816077	8,124038405
67	6,7083816	3,032817492	5,467568631	8,185352772
68	6,771310712	3,055802674	5,509005207	8,246211251
69	6,833757731	3,078616492	5,550132863	8,306623863
70	6,895732665	3,101262717	5,590958398	8,366600265
71	6,9572452	3,123744985	5,631488366	8,426149773
72	7,018304711	3,146066803	5,671729087	8,485281374
73	7,078920274	3,168231553	5,71168666	8,544003745
74	7,139100681	3,190242501	5,751366973	8,602325267
75	7,19885445	3,212102801	5,790775712	8,660254038
76	7,25818984	3,233815503	5,829918372	8,717797887
77	7,317114856	3,255383552	5,868800265	8,774964387
78	7,375637264	3,2768098	5,907426529	8,831760866
79	7,4337646	3,298097003	5,945802136	8,888194417
80	7,491504177	3,319247831	5,983931898	8,94427191
81	7,548863096	3,340264871	6,021820476	9
82	7,605848251	3,361150626	6,059472385	9,055385138
83	7,662466343	3,381907525	6,096892002	9,110433579
84	7,718723882	3,402537921	6,134083571	9,16515139
85	7,774627194	3,423044097	6,171051206	9,219544457
86	7,830182434	3,443428269	6,207798901	9,273618495
87	7,885395586	3,463692587	6,244330532	9,327379053

88	7,940272471	3,483839139	6,280649864	9,38083152
89	7,994818755	3,503869952	6,316760552	9,433981132
90	8,049039952	3,523786998	6,352666149	9,486832981
91	8,102941432	3,543592191	6,388370107	9,539392014
92	8,156528424	3,563287395	6,423875782	9,591663047
93	8,209806021	3,582874419	6,45918644	9,643650761
94	8,262779186	3,602355026	6,494305258	9,695359715
95	8,315452756	3,62173093	6,529235325	9,746794345
96	8,367831447	3,641003801	6,563979651	9,797958971
97	8,419919855	3,660175263	6,598541167	9,848857802
98	8,471722466	3,679246901	6,632922725	9,899494937
99	8,523243653	3,698220256	6,667127105	9,949874371
100	8,574487683	3,717096831	6,701157019	10