Supplement to "Learned D-AMP: Principled Neural Network based Compressive Image Recovery"

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Table 1: PSNR of 128×128 reconstructions with i.i.d. Gaussian measurements and no measurement noise.

$\frac{m}{n} = .05$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	19.32	21.05	16.49	21.98	19.36	21.09	19.22
BM3D-AMP	18.04	18.92	12.25	20.79	18.28	20.38	16.77
LDIT	17.20	19.37	16.94	20.43	17.49	19.51	18.08
LDAMP	**21.26**	**22.44**	**17.04**	**22.84**	**21.30**	**22.74**	**20.17**
NLR-CS	20.31	21.51	14.96	22.05	19.69	21.55	19.22
$\frac{m}{n} = .10$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	21.75	22.95	16.77	23.21	21.98	23.07	20.86
BM3D-AMP	24.36	24.04	**18.07**	24.12	24.44	24.79	22.05
LDIT	19.39	21.49	17.23	22.17	19.13	21.24	19.82
LDAMP	**25.80**	**24.67**	17.36	**24.37**	**26.00**	**25.43**	**22.52**
NLR-CS	25.17	23.84	17.84	23.56	25.18	24.91	21.80
$\frac{m}{n} = .15$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	23.47	24.25	16.97	24.09	24.18	24.74	22.00
BM3D-AMP	27.35	25.67	19.94	25.02	27.37	26.96	23.35
LDIT	20.53	22.54	17.29	23.17	19.74	21.89	19.50
LDAMP	**28.78**	**26.79**	17.65	**25.40**	**29.38**	**27.65**	**23.97**
NLR-CS	28.10	25.57	**20.11**	24.45	28.06	26.82	23.10
$\frac{m}{n} = .20$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	25.20	25.47	17.32	24.84	25.90	26.17	23.08
BM3D-AMP	29.57	27.40	21.19	25.80	29.55	28.55	24.45
LDIT	20.42	22.50	17.34	22.66	21.45	22.29	20.95
LDAMP	**31.10**	**28.58**	18.07	**26.31**	**31.88**	**29.57**	**25.21**
NLR-CS	30.42	27.34	**21.29**	25.56	30.47	28.54	24.18
$\frac{m}{n} = .25$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	26.57	26.53	17.62	25.46	27.49	27.44	23.98
BM3D-AMP	31.39	28.89	21.97	26.50	31.27	30.01	25.37
LDIT	21.59	23.02	17.57	23.61	21.65	23.22	21.04
LDAMP	**32.68**	**30.17**	18.13	**27.06**	**33.87**	**31.06**	**26.20**
NLR-CS	32.42	28.78	**22.04**	26.52	32.47	30.13	25.26

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Table 2: PSNR of 128×128 reconstructions with coded diffraction measurements and no measurement noise.

$\frac{m}{n} = .05$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	21.66	22.70	16.79	23.20	21.94	22.98	20.92
BM3D-AMP	18.37	17.89	13.46	13.32	17.80	16.91	20.83
LDIT	20.20	21.09	16.69	22.31	19.07	20.85	19.98
LDAMP	**22.10**	**23.45**	**17.33**	**23.54**	**22.32**	**23.50**	**20.94**
NLR-CS	15.14	13.44	11.73	18.43	17.23	17.70	16.04
$\frac{m}{n} = .10$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	25.08	25.39	17.34	24.79	25.83	26.13	23.13
BM3D-AMP	25.40	24.48	**18.68**	24.48	25.52	25.53	22.56
LDIT	24.02	24.77	17.31	24.74	24.36	25.24	20.21
LDAMP	**27.90**	**26.50**	17.56	**25.57**	**28.18**	**27.24**	**23.87**
NLR-CS	24.12	21.56	17.11	21.15	24.05	22.27	21.04
$\frac{m}{n} = .15$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	27.78	27.71	17.96	26.05	28.90	28.54	24.90
BM3D-AMP	28.96	25.98	**20.39**	25.12	28.67	27.11	23.63
LDIT	28.44	26.59	17.31	25.73	30.21	26.92	24.28
LDAMP	**30.85**	**28.79**	17.86	**26.68**	**32.07**	**29.54**	**25.69**
NLR-CS	27.35	24.16	18.99	23.28	21.24	24.23	20.58
$\frac{m}{n} = .20$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	30.05	29.93	18.73	27.32	31.62	30.77	26.55
BM3D-AMP	32.08	28.07	**21.41**	25.89	31.47	28.99	24.57
LDIT	31.60	28.61	17.30	26.06	32.15	30.49	25.57
LDAMP	**33.10**	**30.20**	17.94	**27.59**	**34.06**	**32.17**	**27.24**
NLR-CS	26.41	25.26	21.04	23.48	28.18	27.67	23.47
$\frac{m}{n} = .25$	**Barbara**	**Boat**	**Fingerprint**	**Mandrill**	**Peppers**	**Couple**	**Bridge**
TVAL3	32.37	32.13	19.63	28.63	34.20	33.05	28.12
BM3D-AMP	**34.69**	29.59	**22.26**	26.36	34.74	30.51	25.69
LDIT	34.00	30.43	17.65	26.24	35.37	31.02	27.63
LDAMP	34.58	**32.62**	18.60	**29.01**	**36.07**	**33.86**	**28.60**
NLR-CS	31.74	28.16	20.64	25.79	28.60	28.89	21.04

Table 3: PSNR of reconstruction of 128×128 Boat test image with additive white Gaussian measurement noise (AWGN) with various standard deviations (s.d.).

AWGN with s.d. 10					
Sampling rate	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$
TVAL3	21.08	22.84	24.06	24.97	25.75
BM3D-AMP	16.99	23.98	25.40	26.79	27.64
LDAMP	**22.41**	**24.56**	**26.36**	**27.62**	**28.56**
AWGN with s.d. 20					
Sampling Rate	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$
TVAL3	21.00	22.60	23.50	23.94	24.16
BM3D-AMP	21.03	23.67	24.63	25.45	26.03
LDAMP	**22.33**	**24.24**	**25.35**	**26.33**	**26.75**
AWGN with s.d. 30					
Sampling Rate	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$
TVAL3	20.90	22.23	22.74	22.74	22.57
BM3D-AMP	18.43	23.34	24.09	24.46	24.80
LDAMP	**22.11**	**23.80**	**24.55**	**25.10**	**25.34**
AWGN with s.d. 40					
Sampling Rate	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$
TVAL3	20.77	21.80	21.93	21.60	21.12
BM3D-AMP	19.24	23.02	23.55	23.77	23.94
LDAMP	**21.85**	**23.41**	**23.90**	**24.33**	**24.50**
AWGN with s.d. 50					
Sampling Rate	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$	$\frac{m}{n} = .05$
TVAL3	20.58	21.33	21.17	20.53	19.84
BM3D-AMP	19.45	22.69	23.13	23.28	23.38
LDAMP	**21.58**	**22.96**	**23.44**	**23.65**	**23.76**