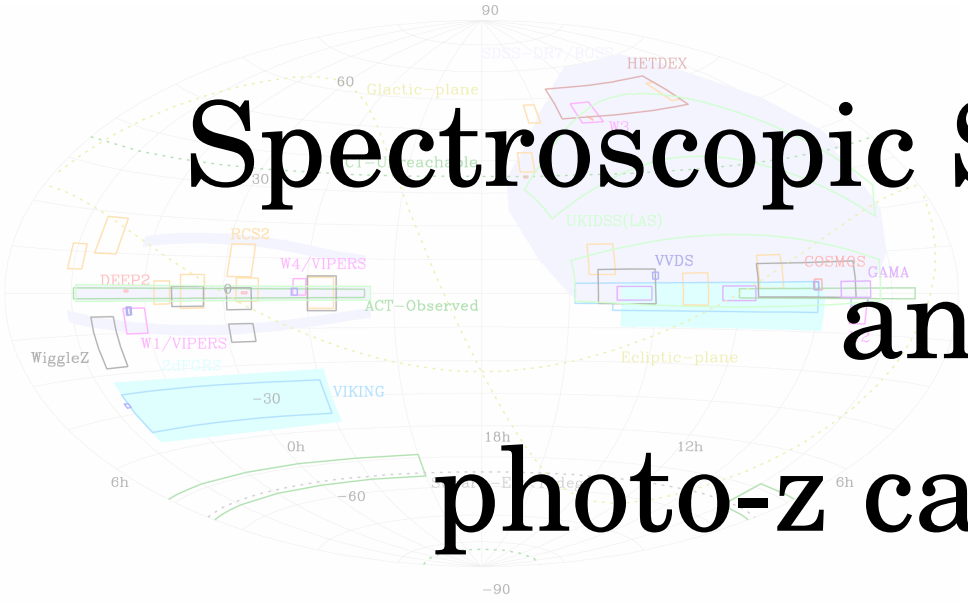
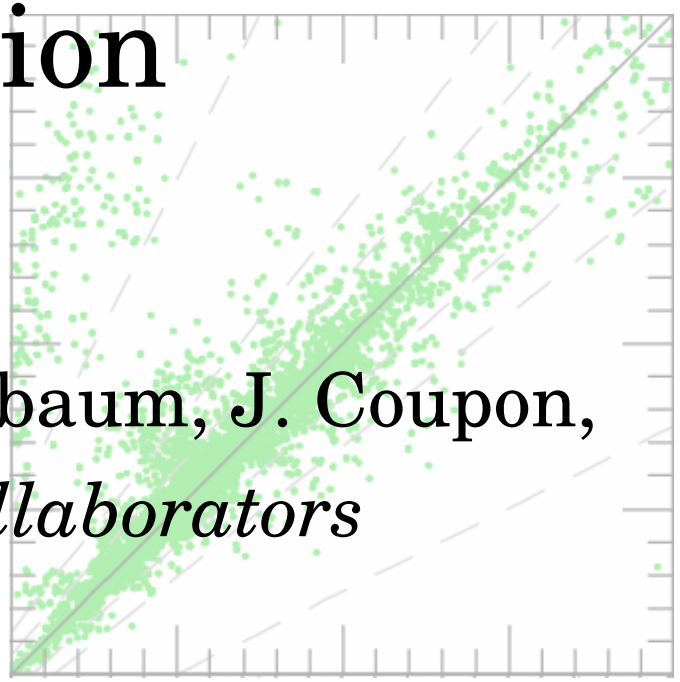
HSC Collaboration Meeting
@ IPMU 23-25 June 2010



Spectroscopic Survey Fields and photo-z calibration



A.J. Nishizawa, M. Takada, R.Mandelbaum, J. Coupon,
and *HSC WL-working group collaborators*

using Spectroscopic data

- Calibrating the photo-z of individual galaxy or overall redshift distribution, N(z) is one of the most important issue for weak lensing analysis.

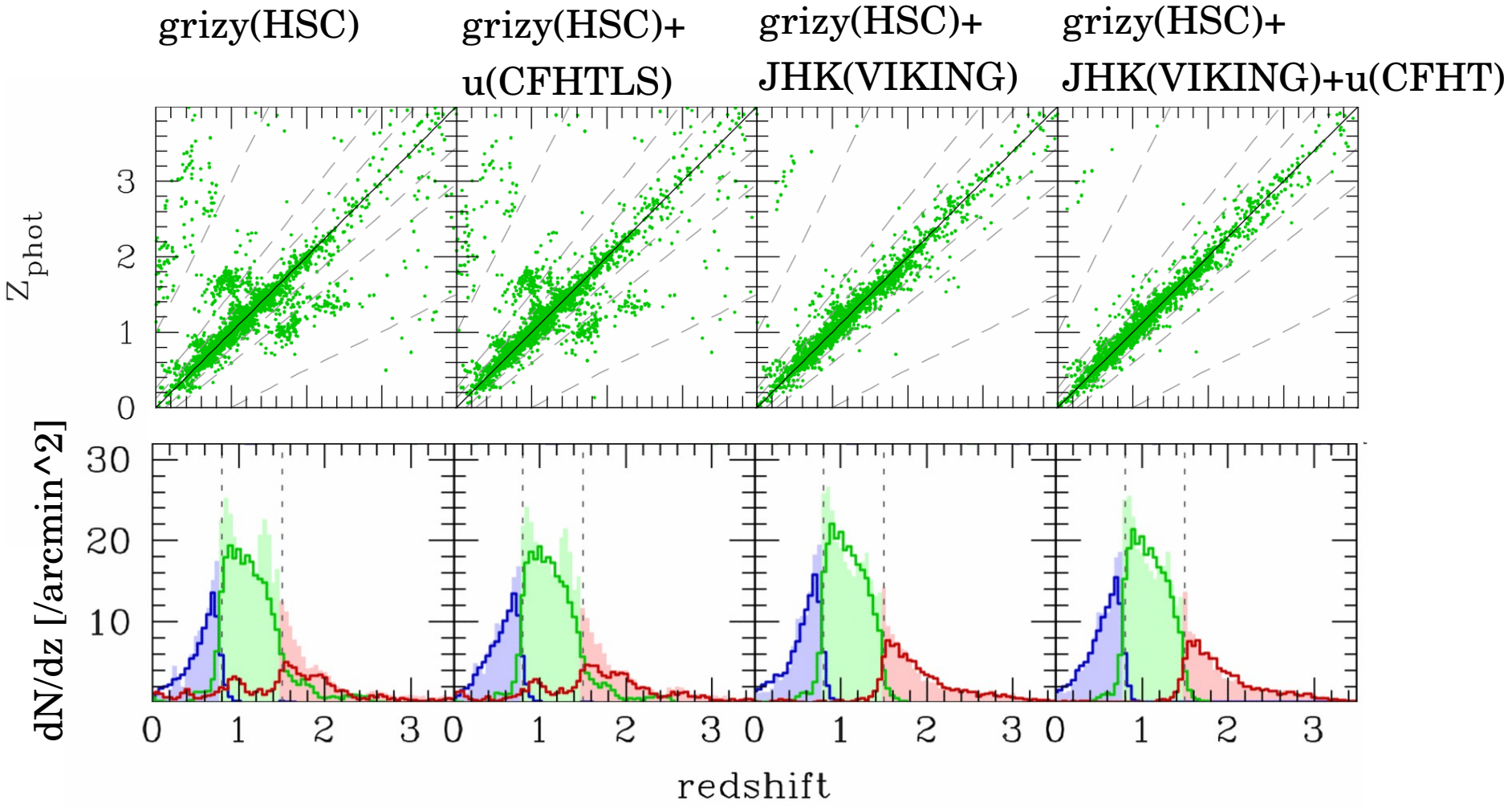
- How many spectroscopic sample do we need for the secure measurement of N(z)?

- How deep/wide should we take the spec-z data?

- ***Weighting method*** (Lima+ 2008) can be used for rather robust estimator of N(z).

using Near Infrared data

- To obtain a better photo-z, NIR data will be great help.

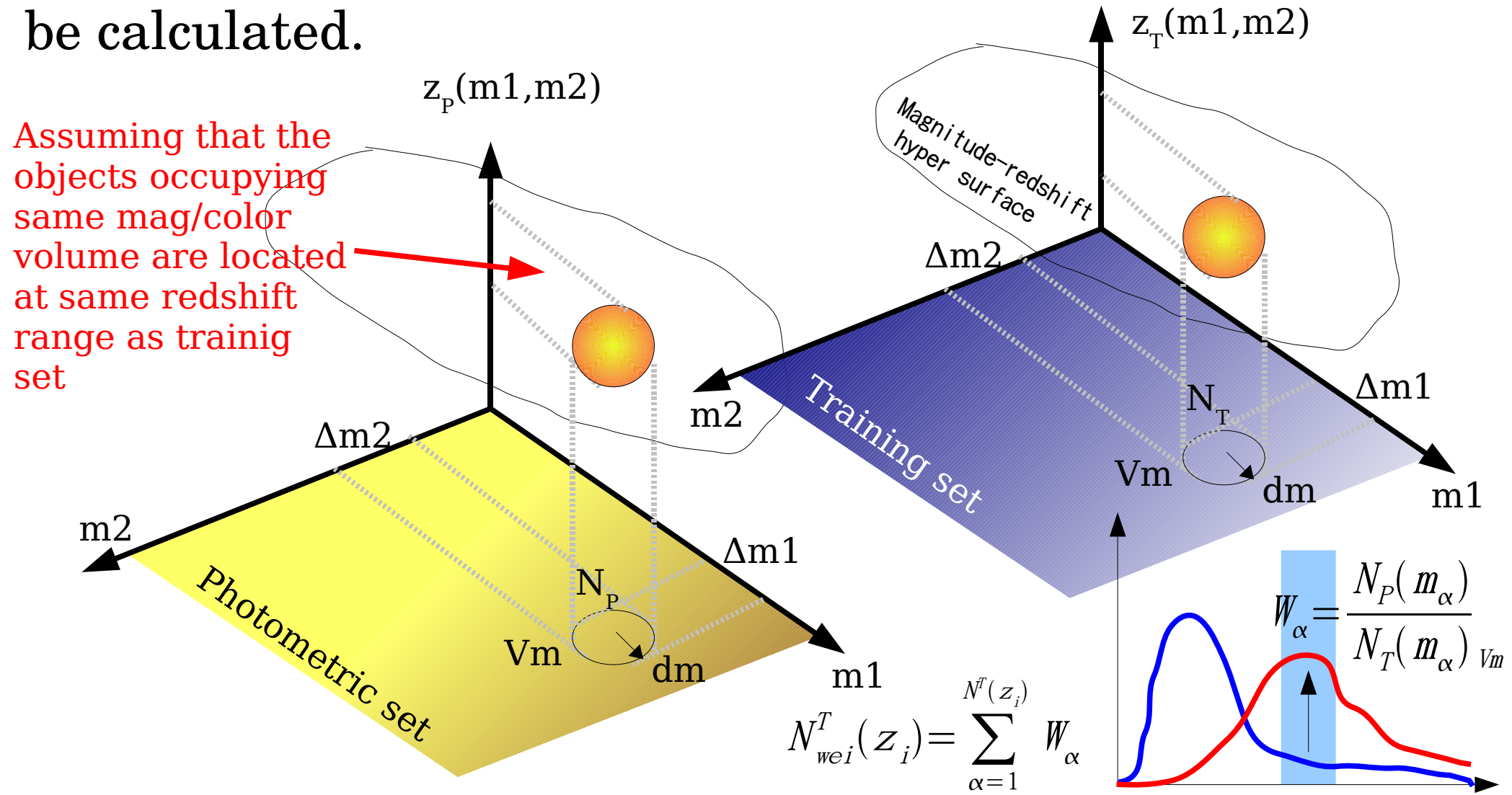


- Even relatively shallow NIR(VIKING-like) data can help photo-z.

(*Nishizawa+2010*)

Weighting method

- Using small subset of photometric sample with spec-z, called *training set*, N(z) of entire photometric sample can be calculated.

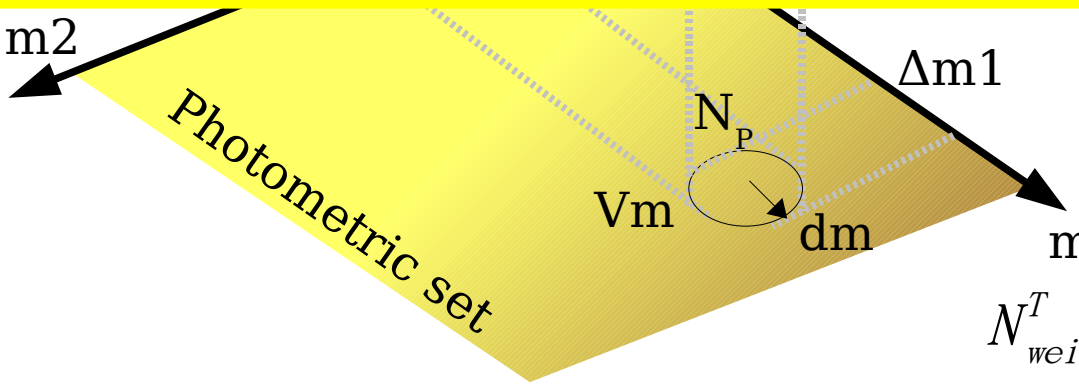


Weighting method

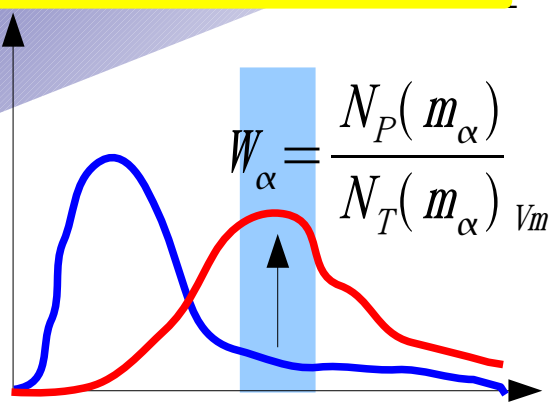
- Using small subset of photometric sample with spec-z,

★ Training set is not necessarily *representative* data of photometric sample.

★ But it must cover as complete ranges of observables (mag/color/etc..) and redshift as possible

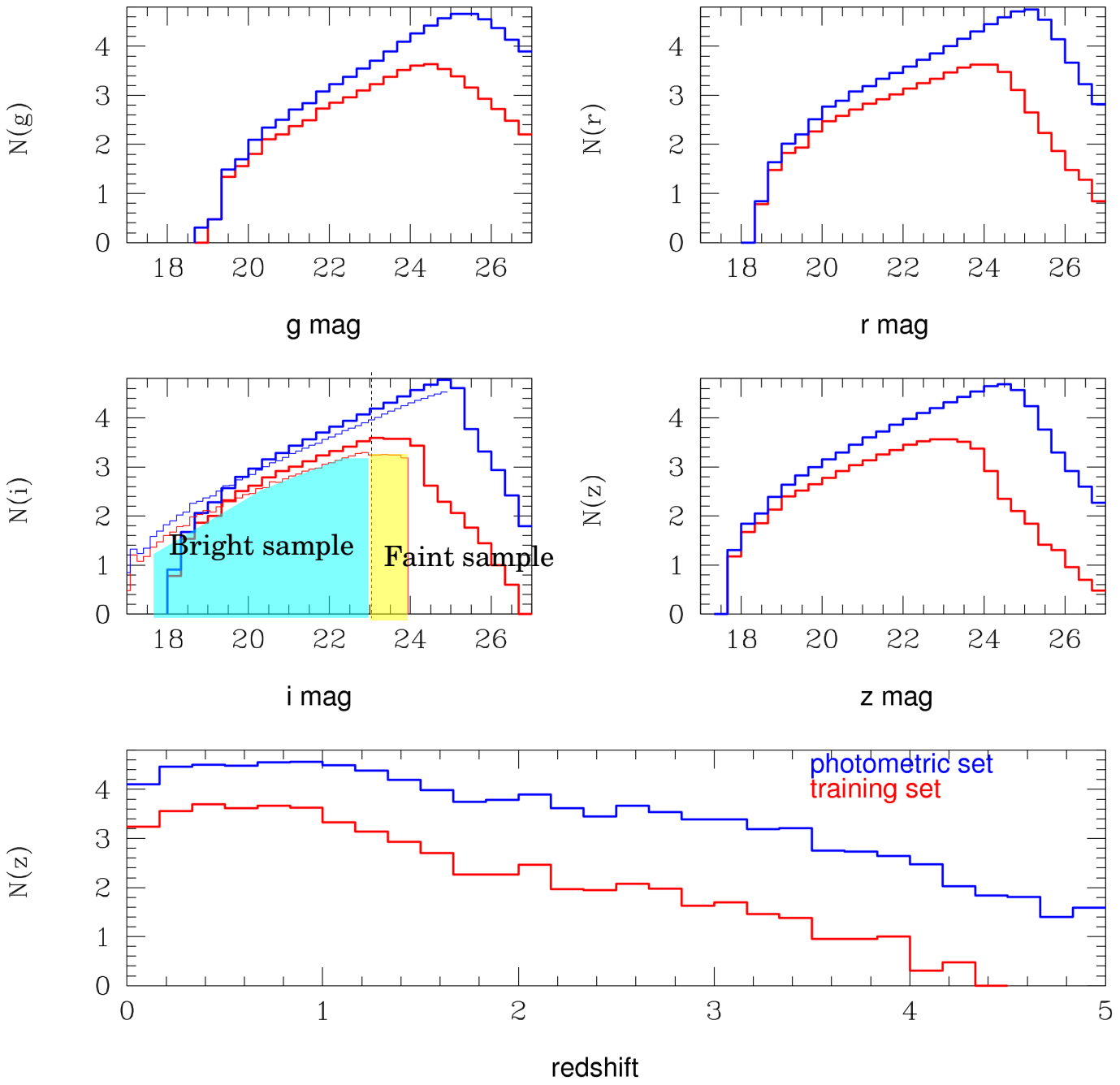


$$N^{T}_{wei}(z_i) = \sum_{\alpha=1}^{N^{T}(z_i)} W_\alpha$$



$$W_\alpha = \frac{N_P(m_\alpha)}{N_T(m_\alpha)\,Vm}$$

Training set (1)



◆ COSMOS photo-z catalog (i_auto < 25 mag) consists of ~3x10^5 gals.

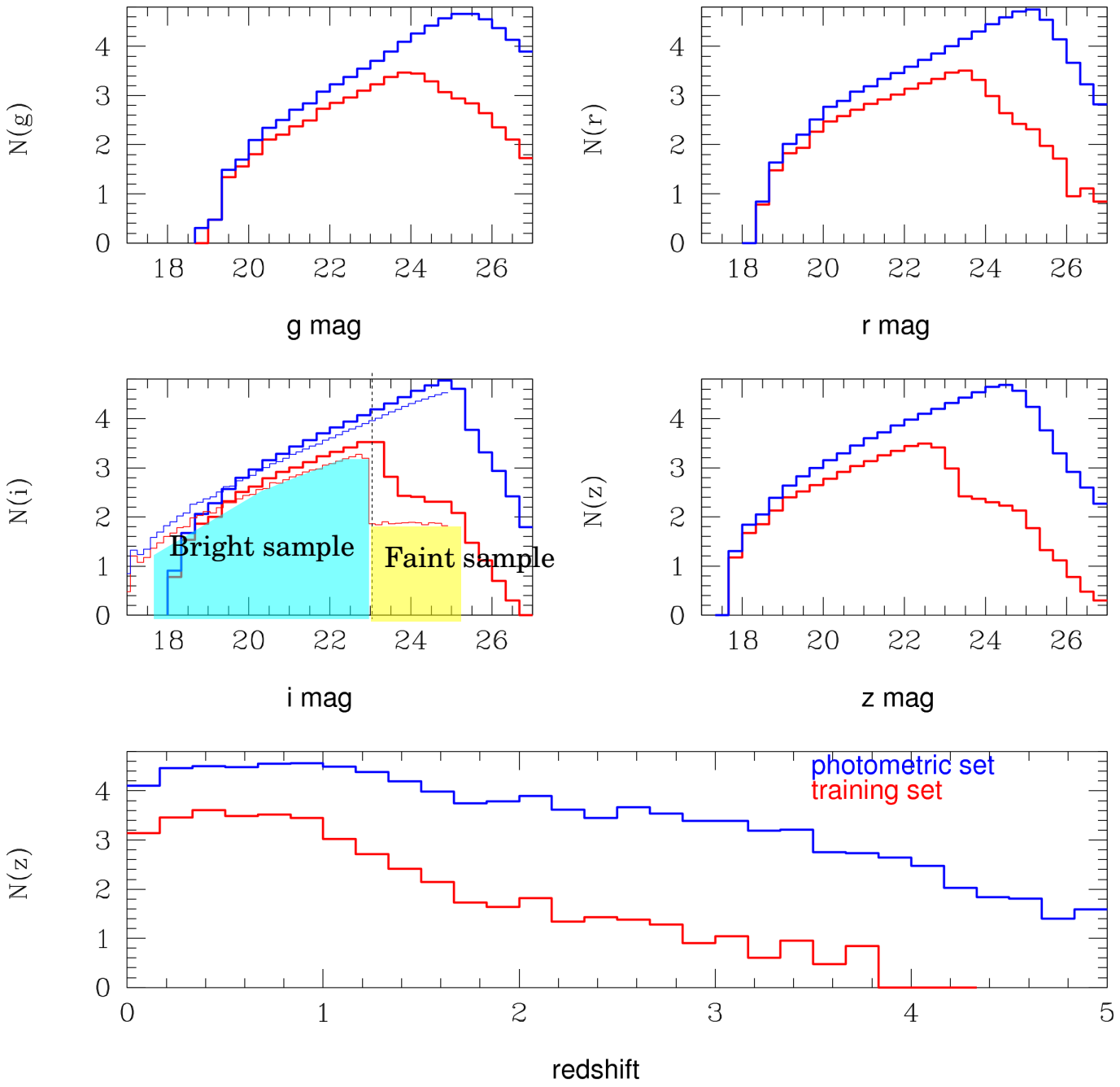
◆ Bands used here are Subaru-g,r,i,z only (but photo-z is measured with 30 photometric bands).

◆ Training set is ...

-- Bright sample= i_a < 23 : taken with 30% completeness.

-- Faint sample= 23<i_a< x: taken so that the N(i_a) =const. The number of faint training sample is 5%/60% of bright training set, and limit magnitude, x is 24/25 mag.

Training set (2)



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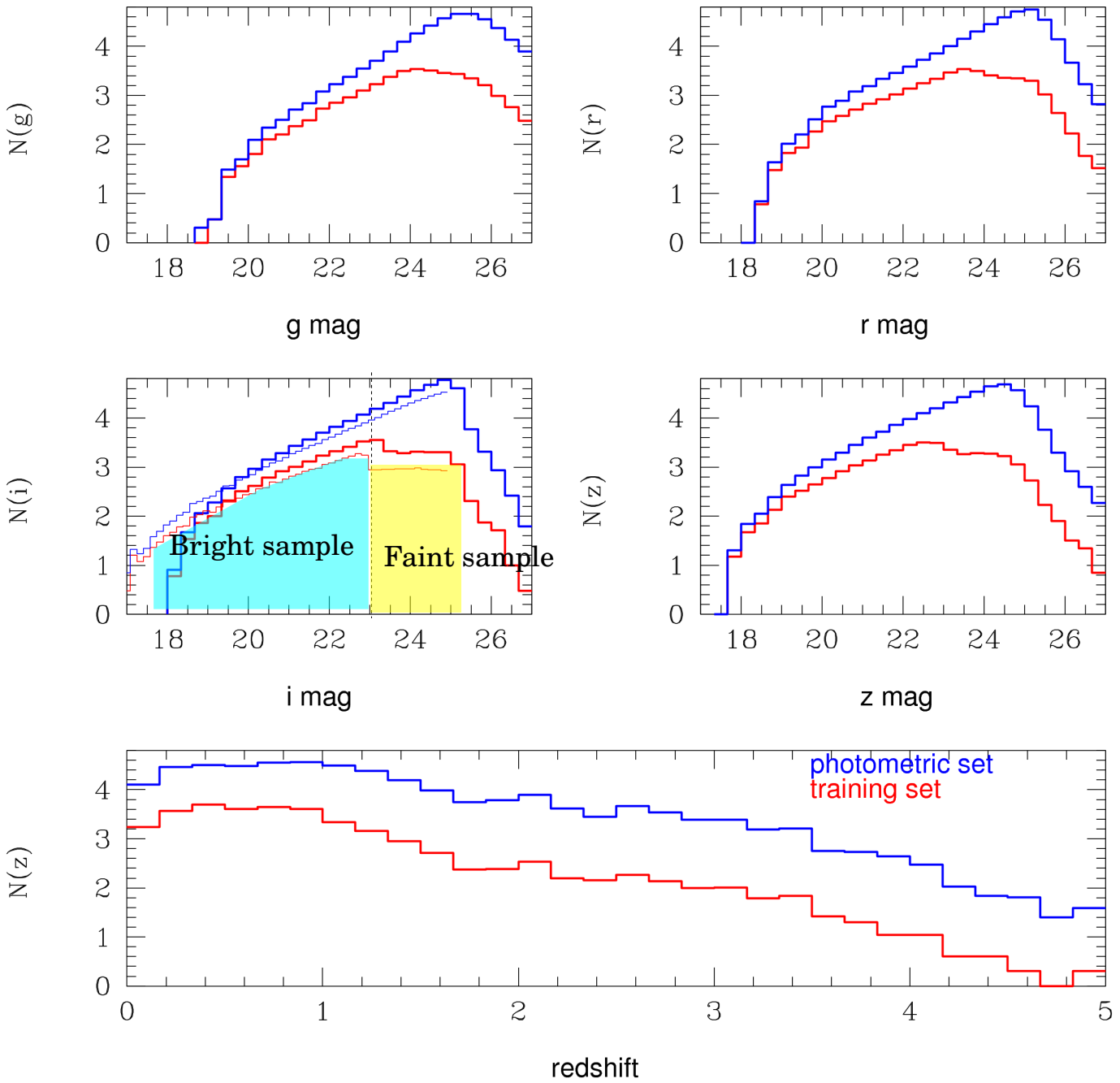
Training set (3)



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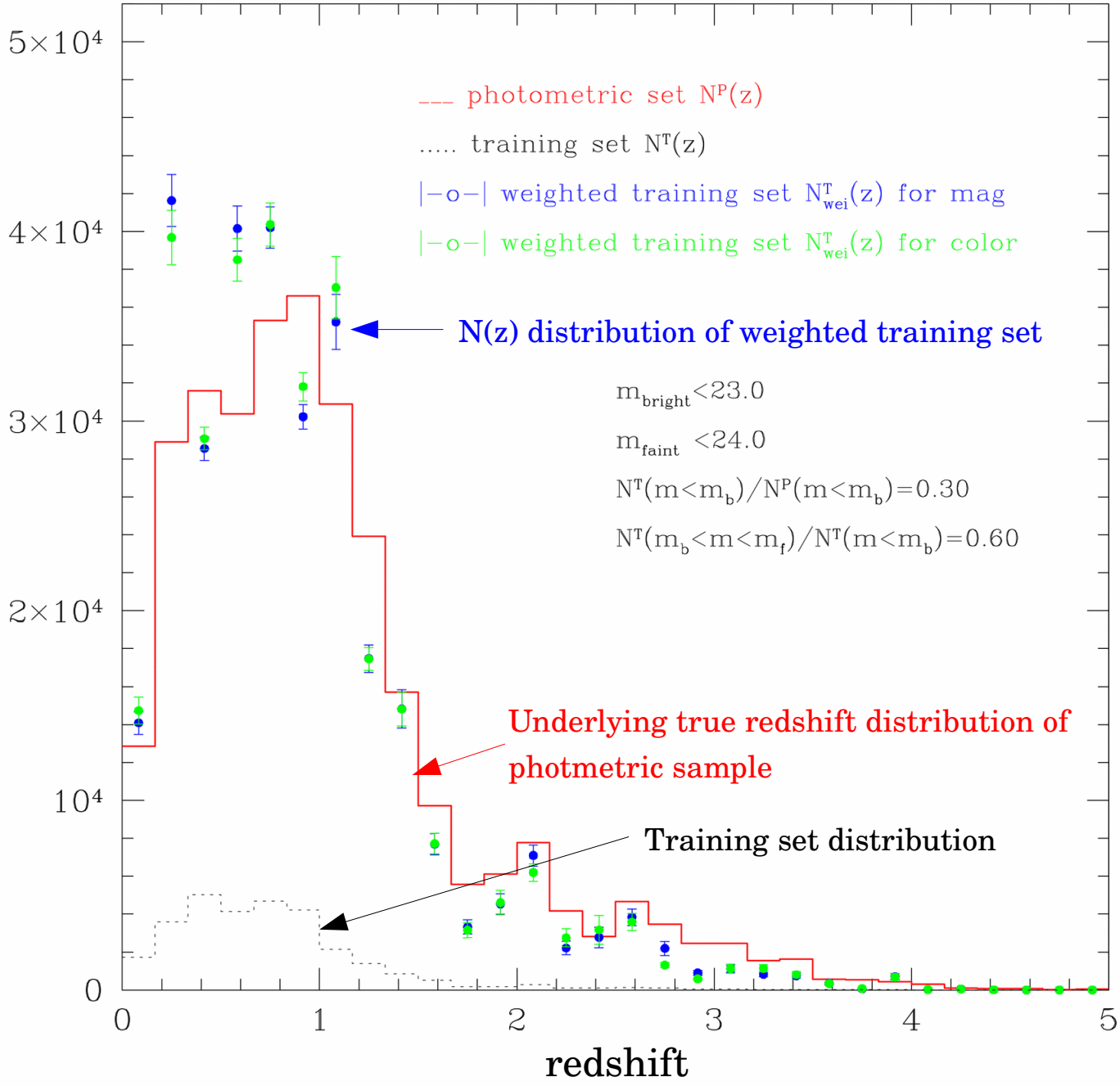
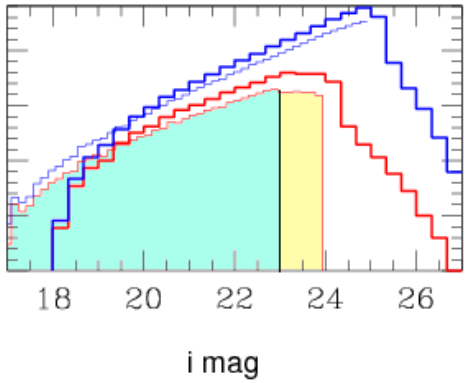
Reconstructed N(z) for TS(1)





Trainig set :

16<i<23 = 1.8x10^4

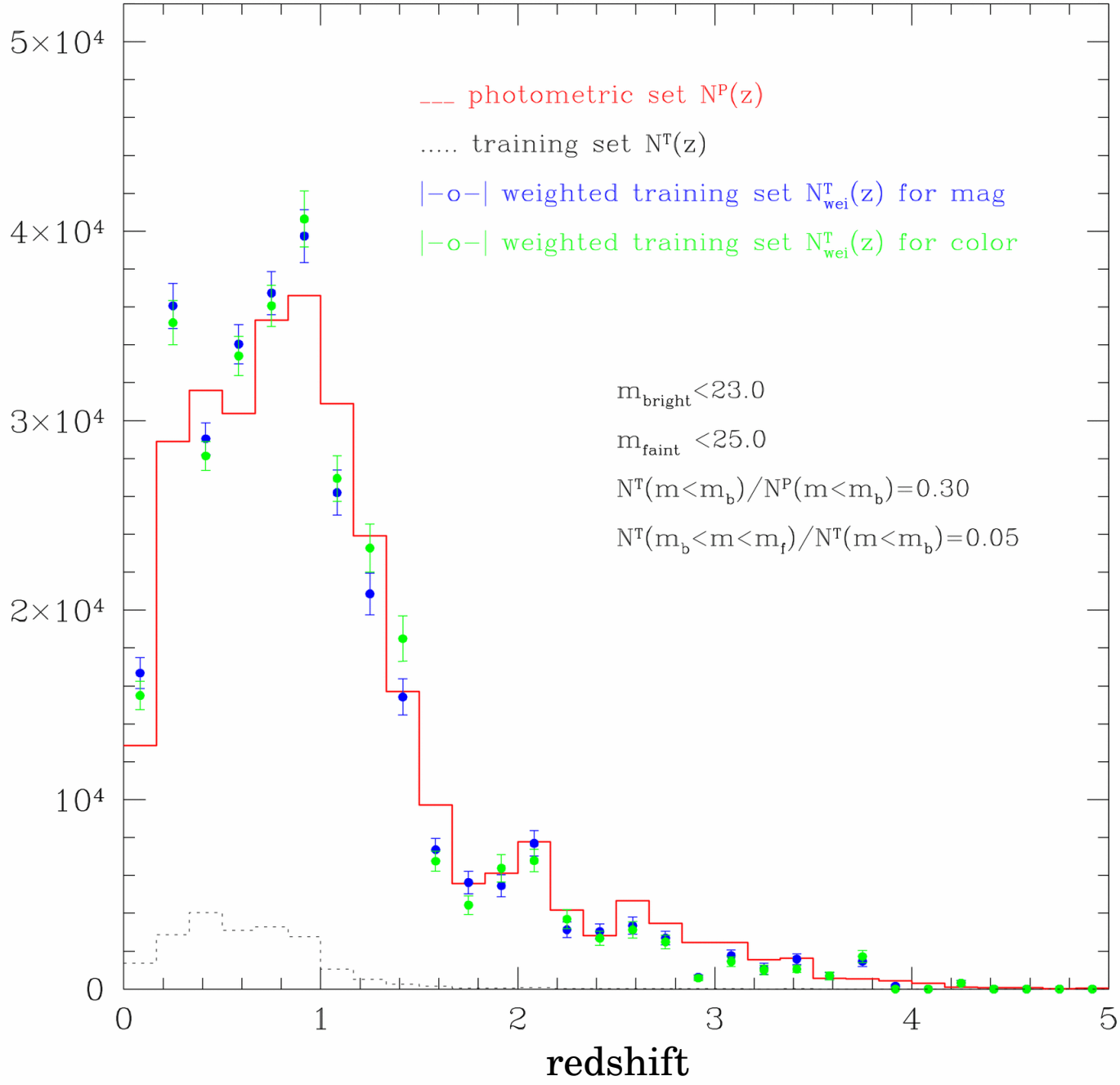
23<i<24 = 10^4

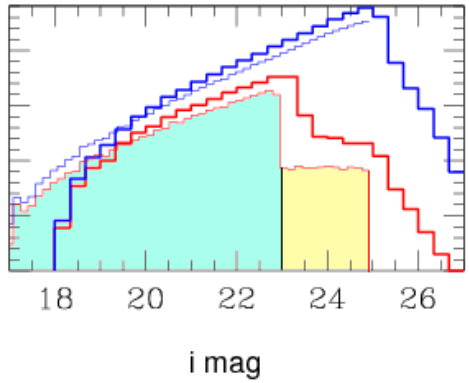
24<i<25 = 0

photometric set:

16<i<25 = 3x10^5

Reconstructed N(z) for TS(2)





Trainig set :

16<i<23 = 1.8x10^4

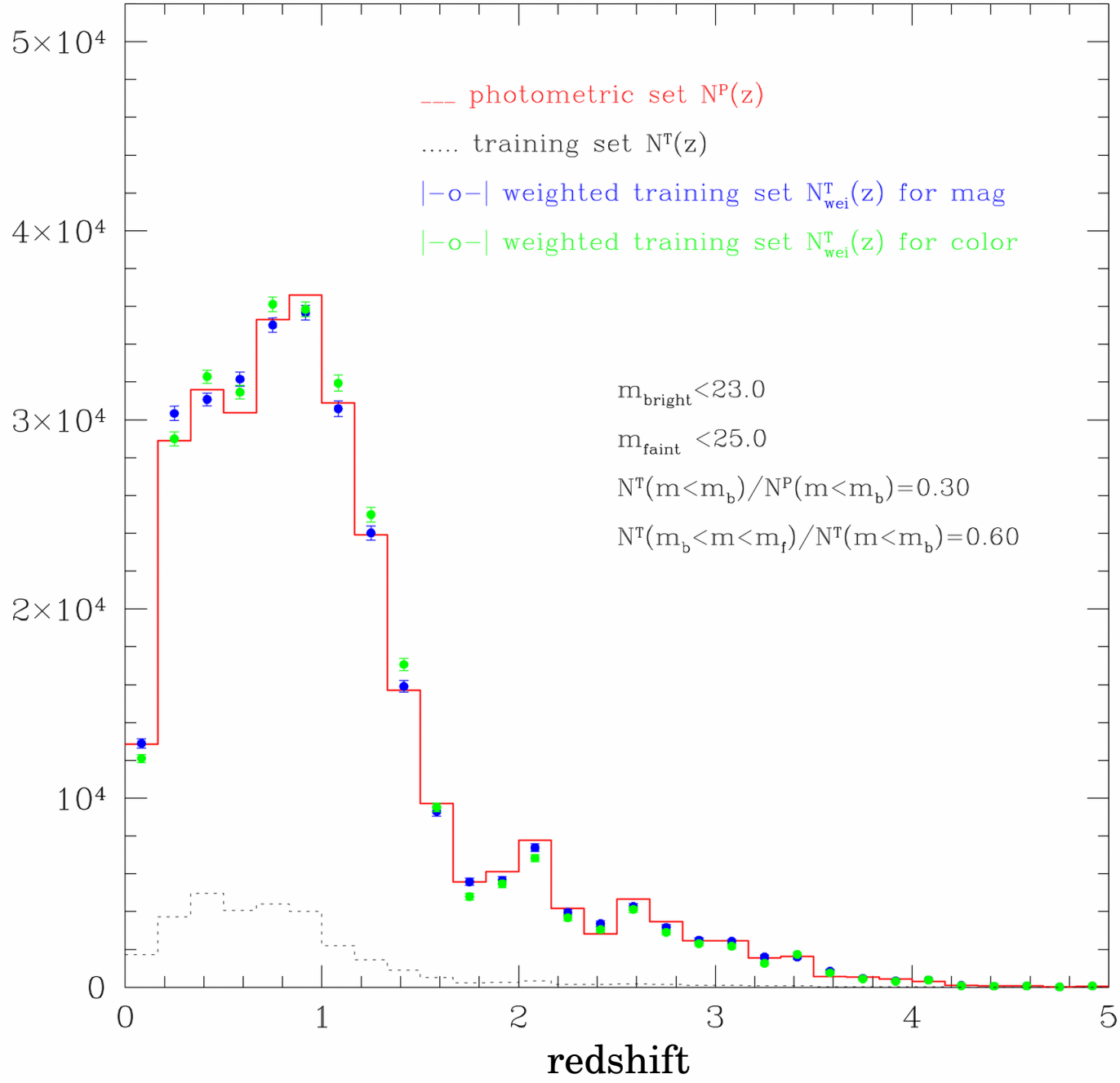
23<i<24 = 5x10^2

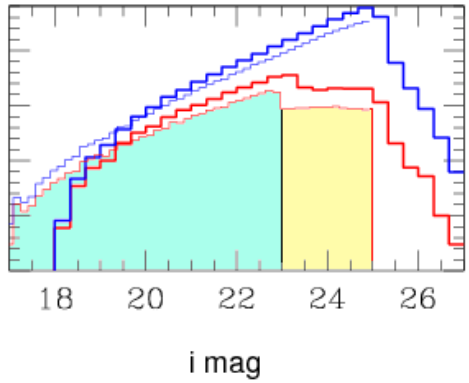
24<i<25 = 5x10^2

photometric set:

16<i<25 = 3x10^5

Reconstructed N(z) for TS(3)





Trainig set :

16<i<23 = 1.8x10^4

23<i<24 = 5x10^3

24<i<25 = 5x10^3

photometric set:

16<i<25 = 3x10^5

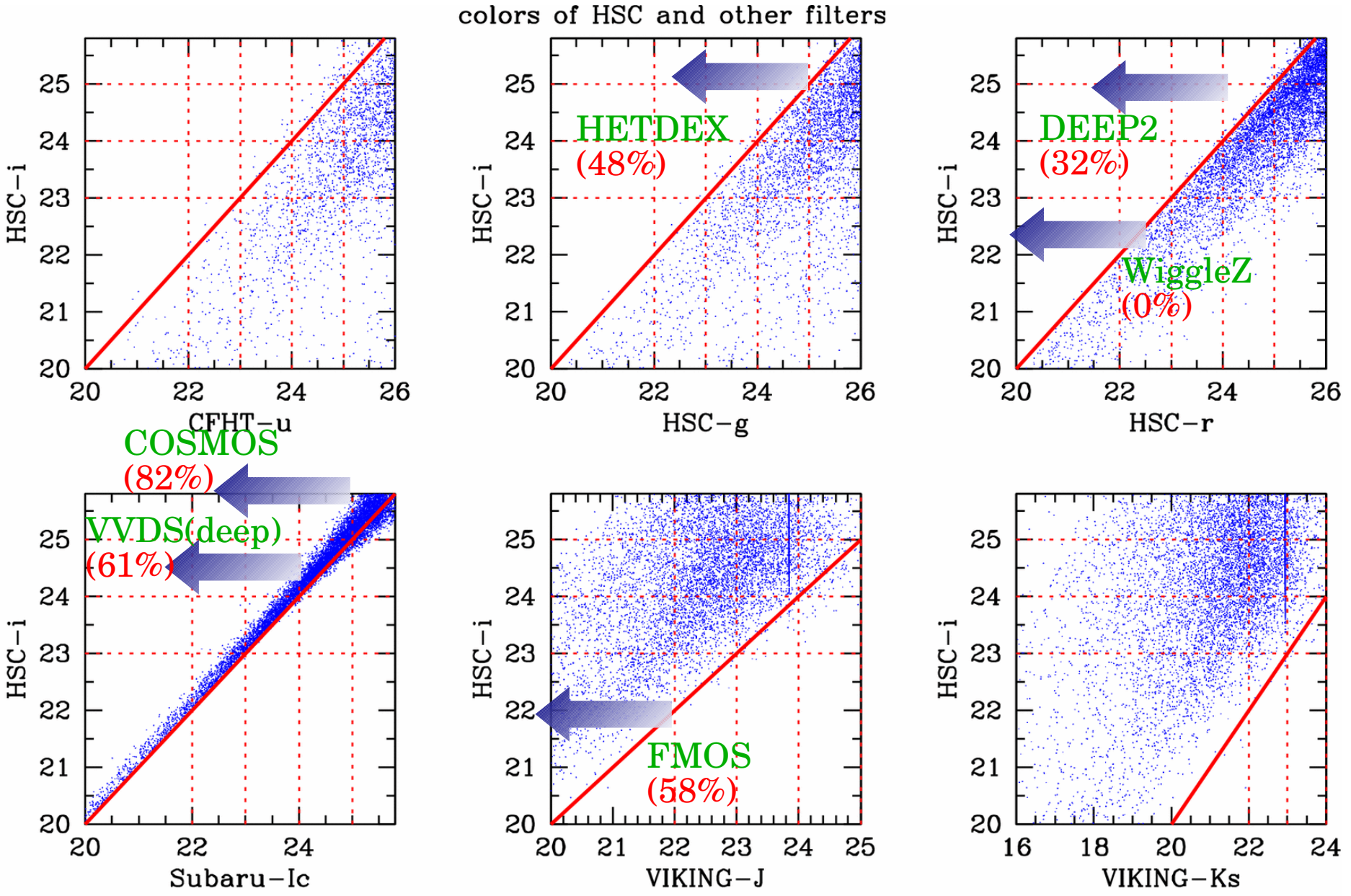
The amount of deep training set desired is around 5-10% of photo-sample!!

Spec-z data ~current status~

How many spec-z data have been/will be available?

Survey	# of spectra	redshift	target	Target Depth	Field	Field of view
FMOS	1.00E+06	1<z<1.7	LAEs	J<22	CFHT-W/RCS	300
HETDEX	1.00E+06	0<z<0.5	[OII]	g<25	SDSSN/UKIDSS	420
	8.00E+05	1.9<z<3.5	LAEs	g<25	SDSSN/UKIDSS	420
DEEP2(3)	5.00E+04	0.75<z<1.4		R<24.1	Stripe82/W3	4
VVDS(wide)	1.00E+05	z<1		I<22.5		18
VVDS(deep)	5.00E+04	z<5		I<24.0		4
VVDS(u-deep)	1.00E+03	?		I<24.75		2
COSMOS(bright)	2.00E+04	z<1.2		I<22.5		1.7
COSMOS(faint)	1.00E+04	1.5<z<3		23<I<25	COSMOS	1
VIPERS	1.00E+05	0.5<z<1.2		I<22.5	CFHT(W1,W4)	24
WiggleZ	2.40E+05	0.2<z<1		NUV<22.8 20<r<22.5		1000
SDSS(main)	6.00E+05	z<0.3	main	r<17.77	SDSS	8000
SDSS(LRG)	1.00E+05	0.2<z<0.7	LRG	r<19.5	SDSS	8000
SDSS(QSO)	1.00E+05	<z>~2	QSO	i<20.2	SDSS	8000
SDSS(stripe82)	7.00E+04	?		u<20.5 r<19.5	stripe82	275
BOSS(LRG)	1.50E+06	z<0.7	LRG	i<20		10000
BOSS(QSO)	1.60E+05	2.2<z<3	QSO	i<20		10000
GAMA	2.00E+05	z<0.5		r<19.4(19.8)		250
2dFGRS	2.50E+05	z<0.2		b_J<19.45		1500
6dFGRS	1.00E+06	z<0.3		Ks<12.65		17220
IRAS(PSCz)	1.50E+04	z<0.1		S60<0.6Jy		35280

Relation between HSC-*i* and others



Y% = N(HSC-*i*>23 & xmag<) / N(xmag<) x100

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COSMOS(bright)	2.00E+04	z<1.2		I<22.5		1.7
COSMOS(faint)	1.00E+04	1.5<z<3		23<I<25	COSMOS	1
VIPERS	1.00E+05	0.5<z<1.2		I<22.5	CFHT(W1,W4)	24
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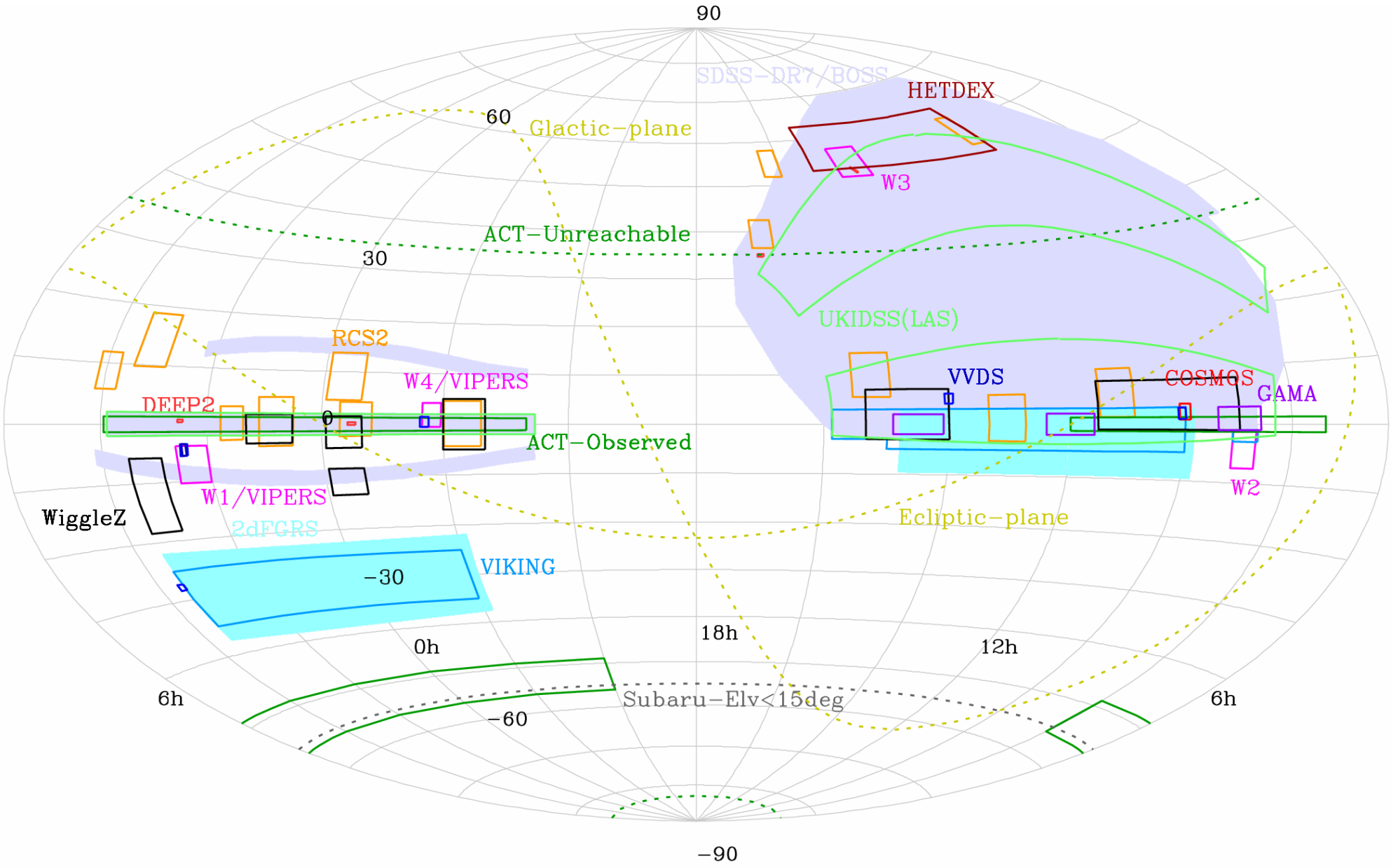

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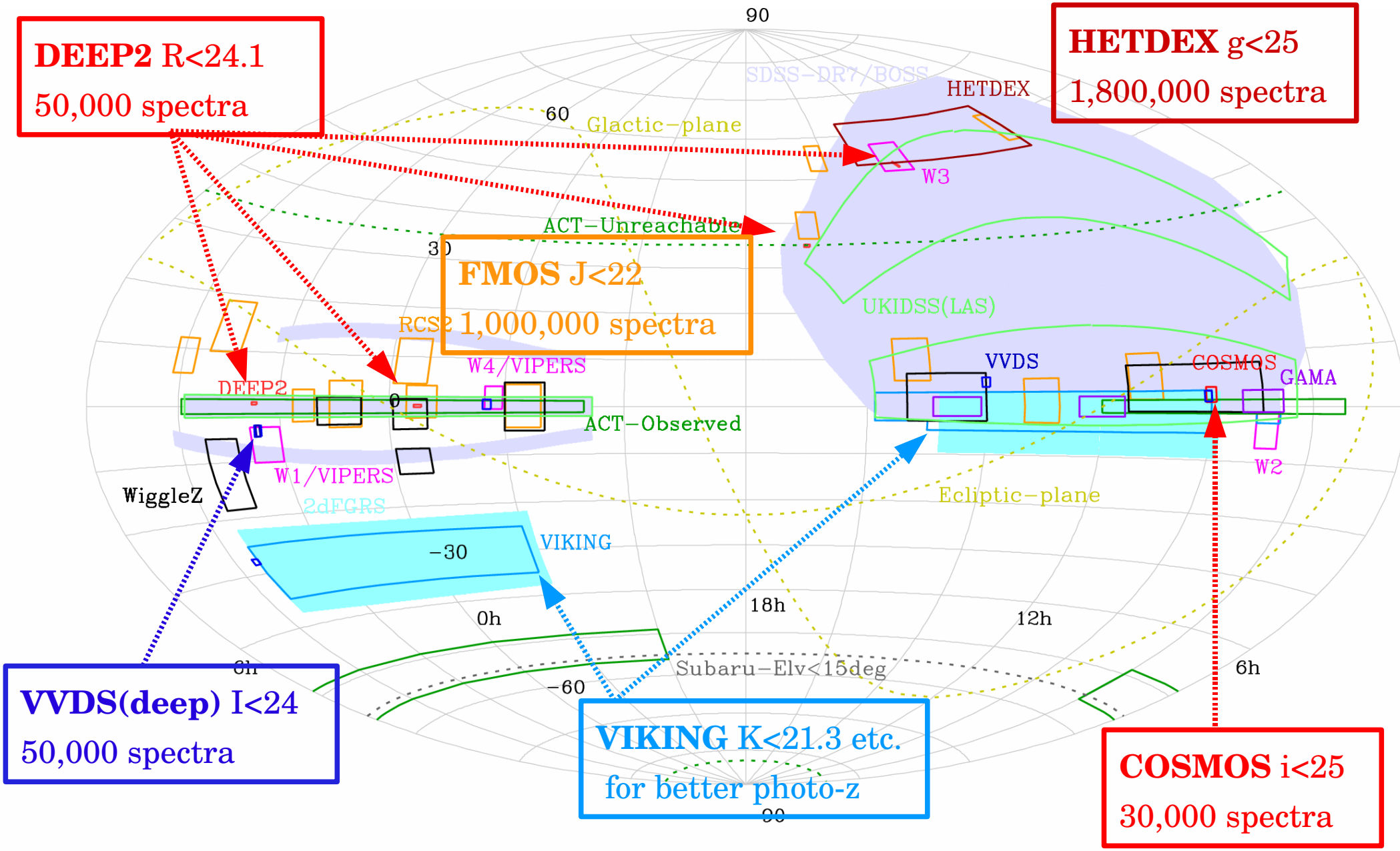

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