A VIMOS spectroscopic redshift Survey in the XXL survey

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Goal: measure sources in the XXLS:
A. AGN up to z~4
    1. in 30 deg² with a density 1000/deg²
    2. in 100 deg² with a density 300/deg²
B. Clusters up to z~1-1.5, 10 galaxies per cluster, 10 clusters per deg²

Baseline specifications:

- to properly identify clusters to z~1.5, need to reach AB~22.5, expose 1h with VIMOS-MR (follow OII-3727 up to z=1.5)
- to identify AGN to z~4, assume that the LRBLUE (3650-6800A) can cover the whole redshift range using classical emission lines, assume 4h on source (S/N~3 on continuum for AB~24)

A. AGN case

Case 1: cover 30 deg² with a density 1000/deg²
One VIMOS field would include about 60 sources.
VIMOS covers 30deg² with 360 pointings, with a one pass only strategy.
In one pass about 80% of the sources would be measured. The limit comes from geometrical constraints.
Total time: for 4h per pointing with the LRBLUE, this means 1440h of spectroscopy, 60h of pre-imaging
Note: one could decide to do 1h exp. time, and loose the faint emission line AGNs.

Case 2: cover 100 deg² with a density 300/deg²
One VIMOS field would include about 20 sources.
In one pass about 90% of the sources would be measured.
100 deg² needs 1200 VIMOS pointings, with 4h per pointing this means 4800h of spectroscopy, hard to imagine going on the VLT.
Again one could relax to 1h exposure time, then 1200h of spectroscopy would be needed.
200h of pre-imaging.

B. Cluster case

About 1 cluster is expected per VIMOS field.
To get 10 galaxies per cluster, especially in the core, requires 2 VIMOS passes.
I assume MR grism with R=600.

Case 1: cover 30 deg²
Needs 720 VIMOS pointings, hence 720h in spectroscopy with MR. Add 60h of pre-imaging

Case 2: cover 100 deg²

Needs 2400 VIMOS pointings, hence 2400h with LRRED. Add 200h of pre-imaging

Notes:
- One could possibly imagine combining a cluster program with an AGN program, using the MR grism and 1.5h integrations. On the AGN identification, this would create a “redshift desert” between 1.5<z<2.2 (loosing OII in the red for z>1.5, before the UV lines enter the blue). An optimisation of the exposure time vs. area based on the minimum line flux required for the AGN science could then be performed.
- Neither the AGN or the cluster cases make an efficient use of VIMOS. These sources could be more efficiently “forced targets” into a larger survey program, as the density of sources is small compared to the general population of galaxies.
- These numbers are for the purpose of discussion, and will need to be iterated based on the science case.