Latigrams

Consider the $n \times n$ grid

```
W   C   S   P
L   O   A   U
L   I   R   N
E   E   O   T
```

of letters. Note that reading the boxed green letters

```
W   C   S   P   →   W
L   O   A   U   →   A
L   I   R   N   →   N
E   E   O   T   →   E
↓   ↓   ↓   ↓
W   E   A   N
```

left-to-right and top-to-bottom produces the pair WEAN–WANE of n-letter anagrams. Necessarily, the letters appear in distinct rows and columns of the grid. Furthermore, there is a total of n such anagram pairs which disjointly comprise the entire square. Here they are in four different colors.

```
W   C   S   P
L   O   A   U
L   I   R   N
E   E   O   T
```

The other pairs are ECRU–CURE, LIST–SLIT, and LOOP–POLO. This object combines the notions of Latin squares and anagrams, so perhaps *Latigram* is a decent name for it.

Problem. Given such a grid of letters, determine how it decomposes into a Latigram. Here are three of different sizes to try.

```
F   A   L        A   P   M   S        C   U   L   S   S
D   A   R        E   P   O   E        P   O   A   E   S
G   O   D        S   A   L   E        R   R   O   E   S
                 N   L   S   T        R   R   V   E   E
                                      S   O   S   T   E
```

Can you create your own? Have these objects already been studied? Do they go by a different name? Happy puzzling!